NATIONAL MUSEUM OF VICTORIA

THE JOURNAL of The Department OF AGRICULTURE

VICTORIA · · · AUSTRALIA

Vol. XXXVII.—Part II. NOVEMBER, 1939. PRICE, 3D.

Registered at the General Post Office, Melbourne, for transmission by Post as a Newspaper

Why let your Profits

BE NIPPED IN THE BUD?

Make Sure of a Clean Crop
By Using

"VALLO"

LEAD ARSENATE

PASTE OR POWDER

Manufactured by

VICTOR LEGGO & FARMERS LTD.

218 QUEEN STREET, MELBOURNE

"VALLO"

CONCENTRATED LIQUID

LIME SULPHUR

Guaranteed to contain a Minimum Polysulphide Sulphur content of 20% —Thiosulphate not more than 2·5%. Total Sulphur content not less than 28%, of which percentage 71% is Polysulphide Sulphur

A Dependable Spray for Fungus Diseases and Pest Control

NOTE.—It has been proved that the Polysulphides alone possess fungicidal and insecticidal properties. This Concentrated Liquid Lime Sulphur is manufactured under conditions that produce a maximum of Polysulphides and a minimum of other constituents

VICTOR LEGGO & FARMERS Ltd.,

Phone C.1243 222 QUEEN STREET, MELBOURNE, C.1 G.P.O. Box 508 H

NATIONAL MUSEUM OF VICTORIA

Contents.

NOVEMBER, 1939

		PAGE
Quality in Pasture Seeds	*F. R. Drake, B.Agr.Sc.*	501
Standard Herd Test—Advanced Register	*W. J. Yuill*	505
Mallee Research Station—Results of Experiments		511
Vegetable Culture	*A. W. Jessep, M.Agr.Sc., B.Sc., Dip. Ed.*	520
Wireless Talks for Farmers		523
Burnley Egg-Laying Competition—Winter Test	*H. F. Clinton*	524
Potato Manurial Trials	*G. H. Mattingley*	527
Victorian Seeds Acts	*F. R. Drake, B.Agr.Sc.*	531
Garden Notes	*A. W. Jessep, M.Agr.Sc., B.Sc., Dip. Ed.*	547
Orchard Notes	*J. L. Provan, B.Agr.Sc.*	548

Issued by direction of the Hon. E. J. Hogan, M.L.A., Minister of Agriculture.

COPYRIGHT PROVISIONS AND SUBSCRIPTION RATES.

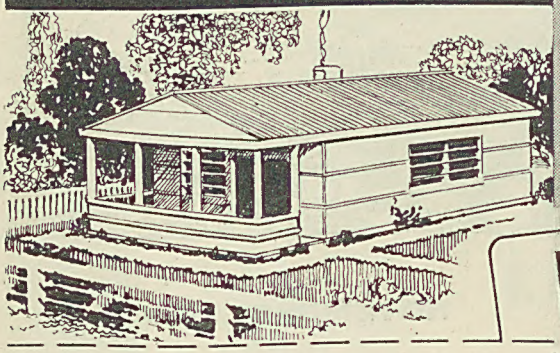
The articles in the Journal of the Department of Agriculture of Victoria are protected by the provisions of the Copyright Act. Proprietors of newspapers wishing to republish any matter are at liberty to do so, *provided both the Journal and author are acknowledged.*

The Journal is issued monthly. The subscription, which is payable in advance and includes postage, is 3s. per annum for the Commonwealth and New Zealand, and 5s. for the United Kingdom and Foreign Countries. Single copy, Threepence. Subscriptions should be forwarded to the Director of Agriculture, Melbourne, C.2.

POSTAGE RATES.

The postage required for this issue is:—To Australia and New Zealand, 1d.; to United Kingdom via France, 2d.; to United Kingdom via All-sea route, 1d.; to other British Possessions, 2d.; to U.S.A. and Foreign Countries, 3d.

Plan farm buildings for ECONOMY with HARDIE'S GENUINE FIBROLITE ASBESTOS CEMENT BUILDING SHEETS



New erections or additions to existing farm buildings can be carried out with Fibrolite Asbestos Cement Building Sheets at bed-rock cost. Any handy man can erect Fibrolite, and the modern Fibrolite Horizontal Mould ensures attractive designs.

PLEASE SEND FREE FIBROLITE BOOKLET

NAME.....

ADDRESS.....

MAIL COUPON FOR ILLUSTRATED BOOKLET

JAMES HARDIE & COY. PTY. LIMITED
Cor. CITY ROAD & CLARENDON ST.
South Melbourne, S.C.5 (Phone MX4727)

INDEX TO ADVERTISEMENTS

FRONT SECTION

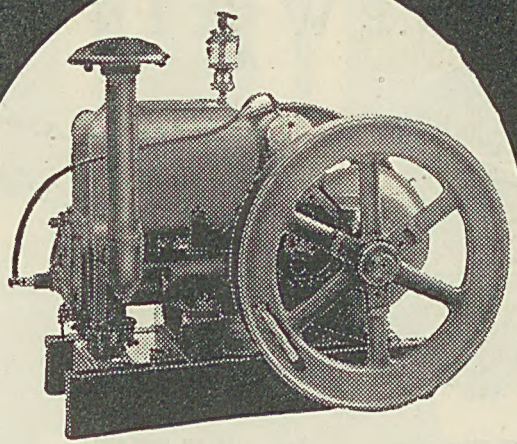
Davis Gelatine Pty. Ltd. (Tri-cal-os) opp. p. 519
General Motors-Holden's Ltd. ... opp. p. 518
Gerrard Wire Tying Machines Co. Pty. Ltd. opp. p. 519
Gippsland and Northern Co-operative Coy. Ltd. (Machinery and Seeds) vi
Goodyear Tyres ... ... opp. p. 506
H. V. McKay Massey Harris Pty. Ltd. ... iii
International Harvester Coy. of Australia Pty. Ltd. (Tractors) v
James Hardie & Co. Pty. Ltd. ii
Lane's Motors Pty. Ltd. (Allis-Chalmers Tractor) ... ... opp. p. 512
Law Somner Pty. Ltd. ... ... opp. p. 507
Leggo, Victor, & Farmers Ltd. ... inside cover
Rylands Bros. (Aust.) Pty. Ltd. iv
Vacuum Oil Coy. Ltd. .. ... opp. p. 513
Wills, W. D. & H. O. (Aust.) Ltd. (Havelock Tobacco) iv

BACK SECTION

Australian Cement Ltd. ... ... inside cover
Blyth Chemicals Ltd. ... ... opp. p. 489
Buncle, John, & Son Pty. Ltd. ... opp. p. 543
Cockbill, J. vii
Cooper Engineering Co. Pty. Ltd. ... opp. p. 542
Dalgety & Co. Ltd. (Electrolux Refrigerator) opp. p. 536
Dunlop-Perdriau Rubber Co. Ltd. outside back cover
Jeyes' Fluid vii
Joyce, A. & Co. Pty. Ltd. vii
Lever's Key Meal ... ... opp. p. 530
Lysaght Bros. & Coy. Pty. Ltd. ix
Neptune Oil Co. Pty. Ltd. ... opp. p. 531
State Savings Bank x
Sterelin and Tetrelin Distributors ... opp. p. 543
Stud Breeders' Cards viii
Trewhella Bros. Pty. Ltd. viii
Victorian Railways x

EVER-READY POWER AT LITTLE COST

It costs so little to have a Sundial Engine drive your CHAFFCUTTER, SEPARATOR, MILKING MACHINE, PUMP, SAW, LIGHTING PLANT, SPRAYER, FEED MILL, SHEARING PLANT, CONCRETE MIXER! It is the most useful helper about the farm, station or workshop.

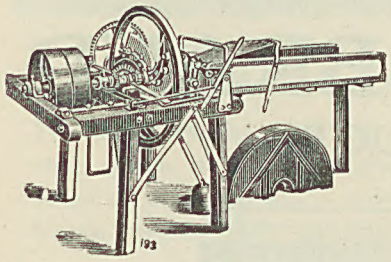


LOW PRICE
LOW UPKEEP
LOW RUNNING COST
DEPENDABLE
SIMPLE
FULL POWER AND MORE TO SPARE

SUNDIAL PETROL ENGINES

2 H.P. and 4 H.P.

SUNSHINE CHAFFCUTTERS



for efficiency, value and long service

Sunshine Chaffcutters have stop motion and reversing gear; positive safety device; extended rail and outer bearing; fast and loose pulleys and belt shifter. They cut 3 lengths of chaff. May be fitted with short elevator and double bagger spouts, or with long elevator from 10 to 20 feet.

No. 4AX—3-knife; approx. 25 cwt. per hour; 8½ in. mouth.
No. 2X—3-knife; approx. 30 cwt. per hour; 9½ in. mouth.
No. 2XP—(Portable) with short elevator and two bagger spouts.

Another popular Sunshine Chaffcutter is the
No. 5 – 2-knife; approx. 10 cwt. per hour; 8½ in. mouth.

CLEAN CUTTING!
PATENT SAFETY FEED!
DEPENDABLE!

Free leaflets give full particulars; ask your local agent, or write direct

H. V. McKAY MASSEY HARRIS PTY. LTD.

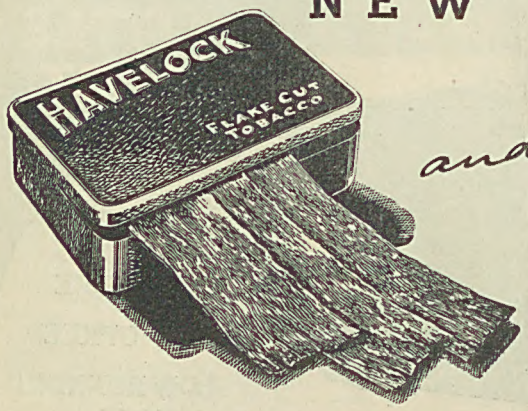
SUNSHINE HARVESTER WORKS, SUNSHINE, W.20, VIC.

Also at MELBOURNE, SYDNEY, ADELAIDE, PERTH

Queensland Distributors: H. V. McKAY MASSEY HARRIS (Qld.) PTY. LTD., South Brisbane

The same high grade tobacco in a smart

NEW TIN



and what's more — a Great Smoke!

HAVELOCK

FLAKE CUT TOBACCO

ALSO FINE CUT

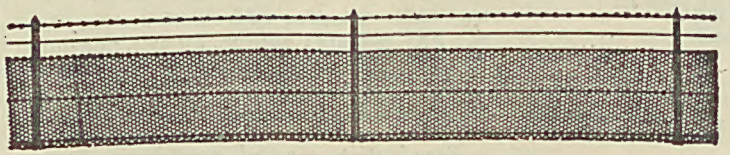
AND READY RUBBED

184-7.9

For Australian Farmers . . !

"WARATAH" BRAND

FENCING PRODUCTS



"WARATAH" WIRE NETTING, FENCING WIRE,

STAR STEEL FENCE POSTS, HINGED-JOINT FENCE, ETC.

100 % Australian from the Ore to the Fence.

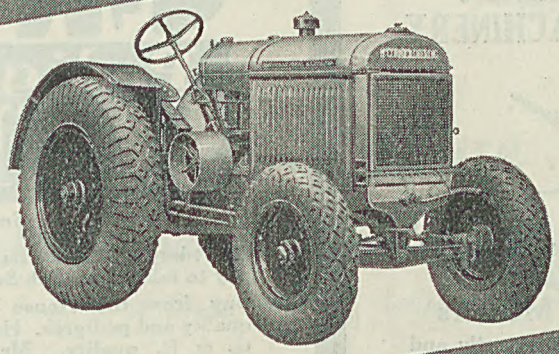
Rylands stand behind their Products—Quality equal to any in the World.

Made by **RYLANDS BROS. (Aust.) PTY. LTD.** Newcastle (N.S.W.)

Head Office: 422 Little Collins Street, Melbourne

MORE THAN

200,000



McCORMICK-DEERING

10-20 TRACTORS

...win fame on the World's Farmlands

The latest Model 10-20 has everything that made its pioneer predecessor's great name—one-piece, oil-bath main frame, replaceable cylinders, abundant ball and roller bearings . . . And every refinement derived from 33 years of practical experience by the world's largest tractor manufacturer.

THE FIRST AND LAST WORD IN TRACTOR POWER

Model 10-20 ranks in the middle range of McCormick-Deering tractors today—a grand economical general-purpose tractor for all field and belt work on the majority of farms. One of the sturdiest and most durable tractors ever built—many of the early models are still in service. Write for a catalogue on McCormick-Deering 10-20 or any of the 17 different McCormick-Deering tractors and TracTracTors — or ask your McCormick-Deering local agent to discuss your tractor needs; he'll gladly give you full information.

INTERNATIONAL HARVESTER COMPANY OF AUSTRALIA PTY. LTD.

(INCORPORATED IN VICTORIA)

171-205 City Road, South Melbourne, S.C.4.

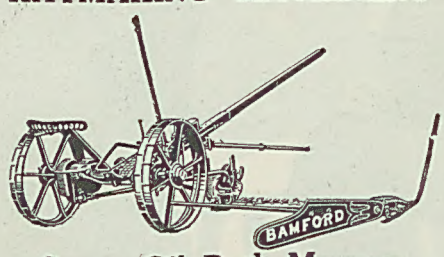
ROBT. NETTLEFOLD PTY. LTD., HOBART, AGENTS FOR TASMANIA 3102

BUILD UP FODDER RESERVES

The Machinery To Use

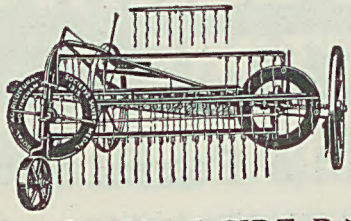
Bamford

100 per cent. BRITISH
HAYMAKING MACHINERY



Super Oil Bath Mowers

Guaranteed to work satisfactorily and to cut toughest grasses with ease. Totally enclosed gears run in oil bath. Perfect balance. Easy draught. Single and two-speed models, horse or tractor drawn.
Sizes 3 ft. 6 in., 4 ft. 6 in., 5 ft. and 6 ft.



Patent Combined SIDE RAKE

An all-purpose implement—Side Rake, Swath Turner, Tedder and Windrower. Fitted with Patent Unchokable Furrow Wheel. Rear Action Type.

Another Bamford Specialty is the HAY LOADER, the great labour saver in the hay field.

Other G. & N. Lines:
Eclipse Milkers, Bamford Engines, Lister Separators, Dairy Boilers, Simar Rototillers, Twin City Tractors, &c.

The Seeds To Sow . . .

"Seeds for Sowing"

Don't buy on a price basis. It does not pay to take risks with Summer Fodders.

Buy from the House that guarantees quality and pedigree. Here's a tribute to G. & N. quality. Mr. J. M. Preston (Garfield) writes. "The Sorghums I tried out last year were very successful, even though it was a very dry season. The height ranged from 6 to 9 feet over the half acre, giving a wonderful lot of feed."

Write for Latest and Lowest Quotations on Your Needs in

- **LUCERNE**
  Govt. passed. Fumigated against Lucerne Flea. Super quality strains.
- **JAP. MILLET**
  New crop. Victorian Grown. Recleaned. A quick grower.
- **SUDAN GRASS**
  A famous drought-resistant strain. Known purity and origin.
- **SORGHUMS**
  A special lot of Ambercane, Imphee and Saccaline.

WE PAY FREIGHT FOR CASH, VICTORIAN ORDERS OVER £2.

FREE. *Seed Samples and Special Bulletin on Sowing of Summer Fodders Write now!*

GIPPSLAND and NORTHERN
CO-OPERATIVE CO LTD

MACHINERY DEPARTMENT:
613 Collins Street, Melbourne, C.1.
(Box 4556 G.P.O., Melbourne.)

SEED DEPARTMENT:
(Reg. Office). 492-4 Flinders Lane, Melbourne, C.1.
Telephone: M 3141 (9 lines)
Telegrams: "Gippsnorth," Seed Dept., Melb.

NATIONAL MUSEUM OF VICTORIA

The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

Journal of Agriculture, Victoria—November, 1939.

Quality in Pasture Seeds

Performance—Not Appearance

By F. R. Drake, B.Agr.Sc., Assistant Agrostologist

FEW commercial commodities vary so much in quality as does the seed used for the sowing of pastures. At the present time, such seed is abnormally expensive, but prices are never so low that the cost of the seed needed to sow a new pasture can be taken lightly. In addition to the cost of the seed, there are other items of expenditure, such as the rental value of the land and the cost of preparing it for planting, a return on which depends primarily on the quality of the seed sown. In view of the high cost of a failure, or partial failure, with pasture sowings, it is surprising that so many farmers are willing to purchase seed without making any inquiry as to its quality.

Farmers are, of course, always keen to save money on the purchase of seed, and often buy seed which is offered below current market rates. Such seed is, however, very rarely cheap in the true sense of the word, and the money spent usually buys less useful seed than would the same amount spent on higher priced seed.

Intending purchasers may well ask how they may obtain the information necessary for them to select seeds which represent good value for the price asked. It is the purpose of this article to describe how seeds are tested, and to indicate the facilities which the Department of Agriculture offers for the assistance of any person buying seed for sowing.

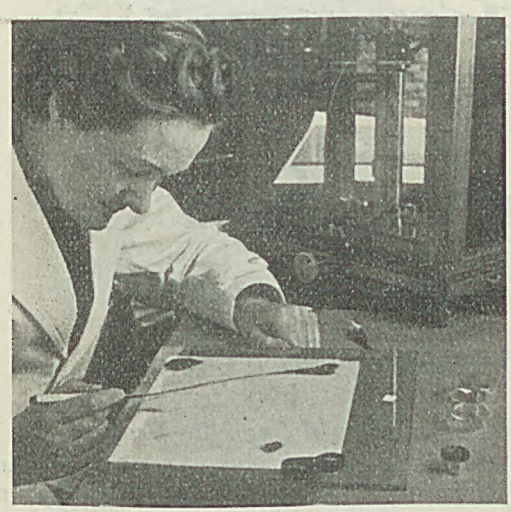
How should Seed be Valued?

It is usual to buy seed at so much per pound or per bushel. The actual value of this pound or bushel will depend on the number of plants which it will produce when sown, and on its freedom from harmful impurities. These qualities will vary from sample to sample, and unless they are known, it is not possible to place a value on a line of seed. Thus a bushel of one line may be the equal, in plant producing capacity, of two or more bushels of another line, and yet both lines may appear similar even on close inspection. Many seed vendors are now prepared to supply details of purity and germination with seeds offered for sale, thus enabling a comparison between lines to be made. In all cases where such information is not available, intending purchasers are strongly advised to submit samples to the Seed Testing Laboratory of the Department of Agriculture for analysis and comment before purchasing. This service is free for farmers purchasing seed for their own sowing.

How Samples are Tested.

A visual examination of a sample of seed will reveal whether it is clean and of bright appearance, but ability to identify the weed seeds present requires training and experience.

Its capacity for growth cannot even be guessed at, and this information can be obtained only from an actual germination test, while something more accurate than a close inspection is required to estimate the quantity of impurities present. It is important to see that the sample submitted for testing is truly representative of the bulk, so that the results of the laboratory tests may apply fully to the line which the sample represents.



Making a purity test at the Seed Testing Laboratory, Department of Agriculture, Melbourne.

The Purity Test.

The purity test, which is always done in duplicate, is the first step in the analysis of a sample. It involves the separation, by hand, of a weighed sample into its component parts, as follows:—

(1) Pure seed (of the kind specified).
(2) Other crop seeds, i.e., seeds of other useful plants.
(3) Weed seeds, i.e., seeds of useless and undesirable plants.
(4) Inert matter, i.e., chaff, empty seeds, earth, &c.

Disregarding for the moment the question of foreign seeds, the important figure obtained from this test is the percentage, by weight, of pure seed in the sample.

The Germination Test.

A germination test is then carried out, using the pure seed from the purity test, and is completed after a period varying from 10 to 28 days, according to the kind of seed under test. This test is quite straightforward for most kinds of seeds, the unsprouted seeds at the end of the test being regarded as dead or non-germinable. In the case of clover seeds, however, many of the seeds which have not sprouted by the end of the test are found to have shown no sign of the normal softening with wetting. Such seeds have seed coats which are impervious to water, and are known as hard seeds.

Hard seeds are usually living, and because of this fact, and also because, when sown, some of the seeds grow as the result of the coat softening in the soil, it is usual to add to the germination capacity obtained by test, one-half of the percentage of hard seeds present in the case of red clover and lucerne, and one-third in the case of all other clovers.

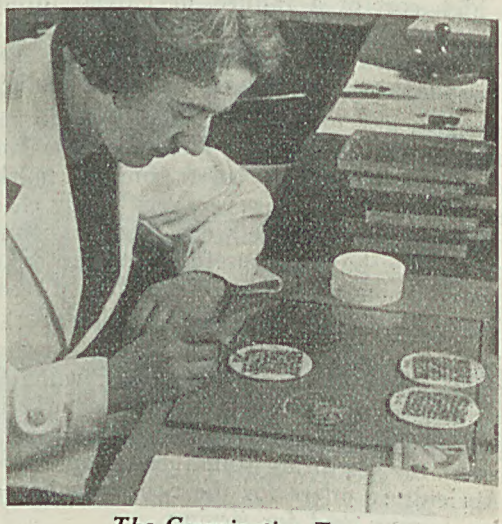
The Real Value of a Sample.

From the two tests described, figures for the percentage of pure seed in the sample, and for the percentage of this pure seed that is capable of germinating (including hard seed allowance in the case of clovers), are obtained. From these it is a simple matter to calculate the percentage of pure germinating seed in the sample, and thus obtain a single figure which is a measure, on a percentage by weight basis, of the real value of the sample.

Thus—

$$\text{Real value or percentage of pure germinating seed} = \frac{\text{Purity} \times \text{Germination.}}{100}$$

This real value figure gives then a statement of the proportion of a sample which is useful, and may be expected to grow when the seed is



The Germination Test.

sown. In this way, by calculation of the real value figure for each, two or more samples of seed of the same species can be directly compared on a straightforward performance basis. The subtraction of the real value figure from 100 shows what proportion of the sample is of no value, and shows how much of the sample would remain after removing all the living seeds of the kind specified.

The Presence of Weed Seeds.

So long as the valueless portion of a line of seed consists only of chaff, dirt, and non-germinable seeds, it merely reduces the sowing value of a unit weight of the seed, and is not directly harmful. Most lots of seed, however, will contain some weed seeds, and the extent to which weeds are spread by the sowing of dirty agricultural seeds is not sufficienty realized. In

Perennial Rye Grass.

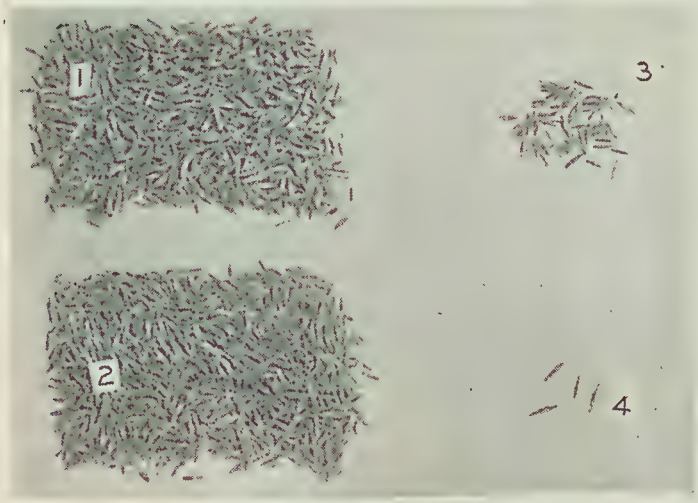


Fig. 1.—Sample A.

(1) Original Sample, (2) Pure Seed, (3) Inert Matter, (4) Weed Seeds.

Analysis.

		%
Pure Seed	..	98·5
Weed Seeds	..	0.1
Inert Matter	..	1.4
Germination	..	96·0
Real Value	..	$\frac{98·5 \times 96}{100}$
	=	95

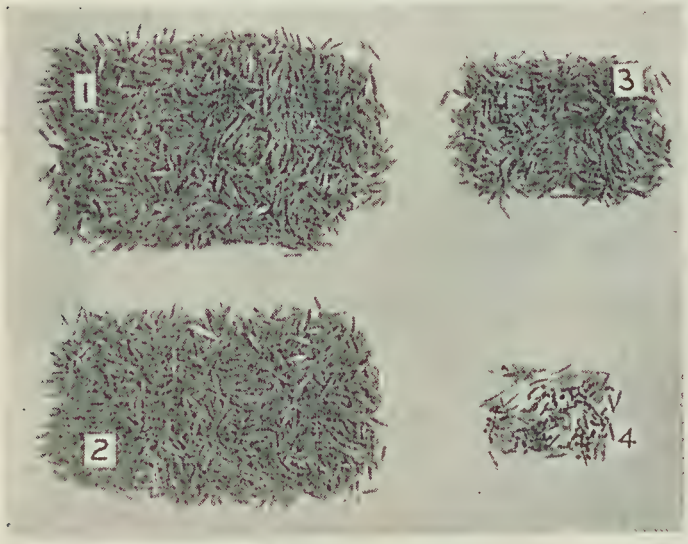


Fig. 2.—Sample B.

(1) Original Sample, (2) Pure Seed, (3) Inert Matter, (4) Weed Seeds.

Analysis.

		%
Pure Seed	..	85·6
Weed Seeds	..	4·5
Inert Matter	..	10·0
Germination	..	52·0
Real Value	..	$\frac{85·6 \times 52}{100}$
	=	45

By the purity test a heavy weed infestation of sample B is shown, while the germination test further reveals that nearly half of the the pure seed is non-germinable. Compared on a real value basis, sample A is worth more than twice as much as Sample B, while the weed infestation further reduces the value of the latter. If the good sample is worth 20/- per bushel, sample B is only worth 9/6 and even if it could be procured for this sum, its weed seed content is far too high.

the purity test, the weed seeds are separated, the quantity present calculated as a percentage of the sample by weight, and the various kinds identified and listed, so that a seed analysis statement shows clearly the degree of contamination.

With the development of seed-cleaning machinery most weed seeds can now be largely eliminated, and there is no excuse for either the sale or the sowing of heavily infested seed. Intending purchasers should refuse all seed which contains any seed at all of noxious weeds or weeds which they know to be troublesome, and further, should not countenance the presence of more than very small amounts of the commoner and relatively harmless weeds. Some idea of the number of weed seeds that may be introduced with seed is given when it

Subterranean Clover.

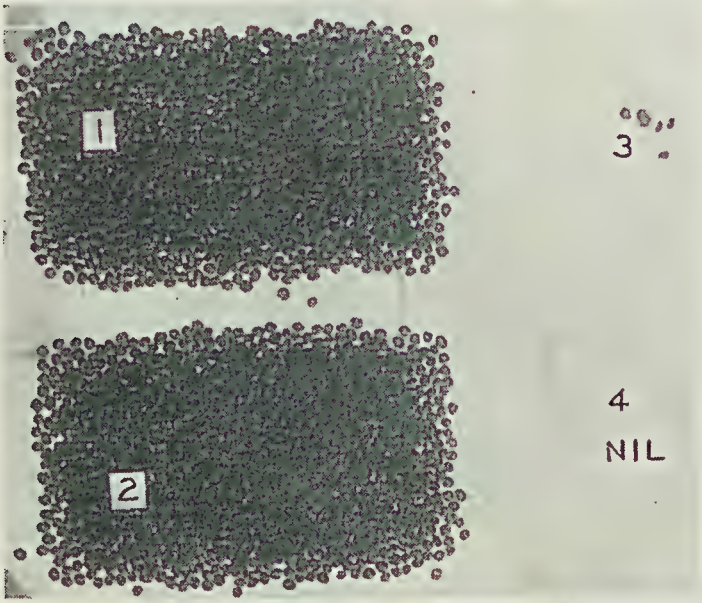


Fig. 3.—Sample C.

(1) Original Sample, (2) Pure Seed, (3) Inert Matter, (4) Weed Seeds.

Analysis.

	%
Pure Seed ..	99·9
Weed Seeds ..	Nil
Inert Matter ..	0·1
Germination ..	93·0
Hard Seeds ..	6·0
Germination + ⅓ Hard Seeds ..	95·0
Real Value ..	$\frac{99·9 \times 95}{100}$
=	95

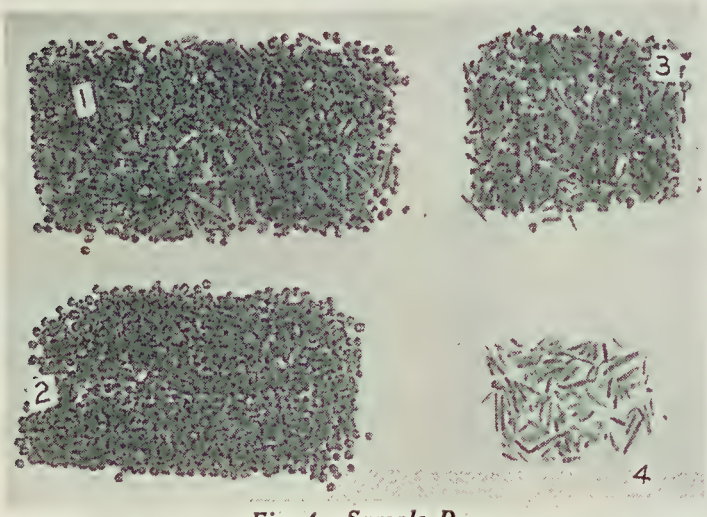


Fig. 4.—Sample D.

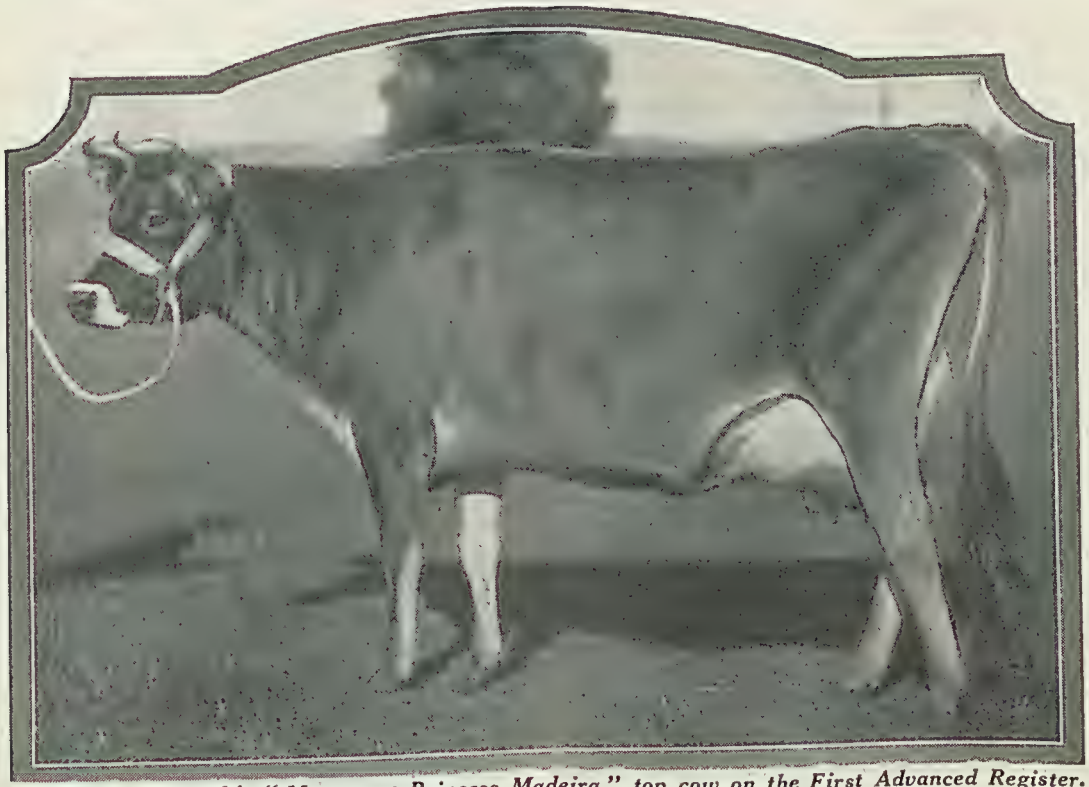
(1) Original Sample, (2) Pure Seed, (3) Inert Matter, (4) Weed Seeds.

Analysis.

	%
Pure Seed ..	60·6
Weed Seeds ..	6·1
Inert Matter ..	33·3
Germination ..	30·0
Hard Seeds ..	60·0
Germination + ⅓ Hard Seeds ..	50·0
Real Value ..	$\frac{60·6 \times 50}{100}$
=	30

If sample C is valued at 1/9 per pound, sample D is worth only 6½d. per lb. with again the serious added objection of its high weed seed content.

[Continued on page 510.



Mr. R. M. Chirnside's "Mornmoot Princess Madeira," top cow on the First Advanced Register.

The Standard Herd Test

First Advanced Register

By W. J. Yuill, Supervisor of Herd Testing

THE intensive development of herd-testing among the dairy farmers of Victoria has had many unexpected repercussions, one of which was the unanimous request from an annual conference of herd-testing association delegates, that the Department of Agriculture be asked to supply more information of the individuality of the tested stock from which dairy farmers were selecting their herd sires. It was hoped that, in addition to known records, some independent body should state whether the cows had good udder character and sound conformation. It was also considered that this could be done by means of a special register. Such a register was expected to accomplish two things, viz.:—

1. To accredit production merit on a multiple lactation basis.

2. To accredit the greater merit of production with type superiority co-existing in the one animal.

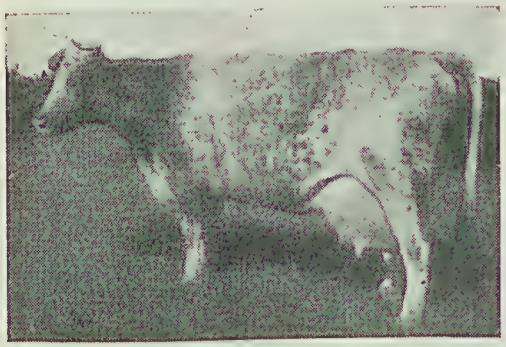
3. To duly discredit, irrespective of yield, cows of an innate conformation so defective as to seriously impair the economic value of the yield.

4. To facilitate the buying of bulls by relieving the buyer of the necessity for personal inspection of the dam.

Obviously such a plan must have herd-test work for its base, for, while inspection could be carried out at short notice, the yield could be obtained only over a specified period of years.

Details of the plan were submitted to a conference of representatives of breed societies. The original plan made provision for the whole

of the classification on breed type, and conformation being carried out by the societies concerned. Much of the value of the register, however, was lost when the various breed executives decided not to co-operate in the development of the register. Because of this, it was not possible to proceed with the auxiliary section of inspection.



Mr. W. K. Atkinson's "Willow Park Cherry," Champion long distance cow on the register.

The register now being adopted is based on yields, and will take the place of the "long distance list" of producers which was a feature of past annual reports of the standard herd test. Details of pedigree, production attainment for a period of four consecutive years, highest record, life-time yield, the sire and dam, and the present owner are, however, available, and are included in the details of the advanced register concerning each qualified cow.

Because breeders will desire to have their stock qualify for the advanced register at the earliest possible age, it was necessary to decide which age correction factors should be used. Data was available from investigations that have been held in the other countries, but it was thought that there was just the possibility that our own field methods of dairy farming might have an unexpected influence on the rate of maturity. Because of this, a survey was made of the 35,000 records which have accumulated in the standard herd test during the past 26 years. The results obtained indicate that there is no material difference in the rate of maturity in this country, despite the difference in our methods of farming.

Our investigation included all cows that had begun test as two-year-olds and had calved at least three times. In order to ascertain whether herd management had improved, and if there was a higher degree of efficiency in the stock now being tested, the investigation was carried out in two sections, viz.:—

1. All cows recorded during the first eighteen years of testing.

2. All cows now undergoing test—approximately the work of the past eight years.

Figures of average yield for ages were also taken out for the whole 26 years of the standard herd test. No discrimination was made with regard to breeds, for it is evident from other investigations that, for the purpose of the advanced register, the slight inter-breed variation in the rate of maturity is insufficient to warrant any serious consideration being given to it.

A review of the average yields of cows now undergoing test shows an increase in all classes except that of the senior four-year-old. There is an increase of 31 lb. in the junior two-year-old class, while the mature cow of to-day has improved from 376 to 395 lb. butter-fat, when the first period of the survey is compared with the latter. It is not possible to state whether the whole of the improvement is due to breeding, or in part to improved feeding methods—doubtless it is due to a combination of both influences.

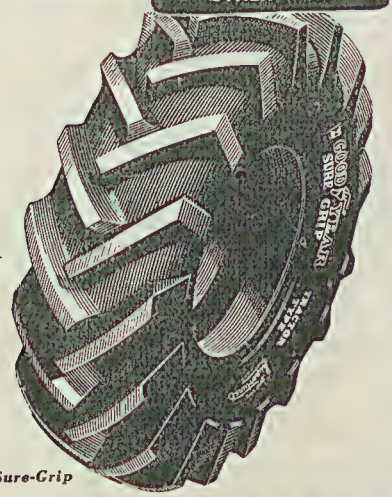
One regrettable feature indicated by the survey is the general withdrawal of tested cows after their fourth or fifth lactation. It will be noted that only 47, or 8.5 per cent., of all tested cows in the current section of the survey were kept on test. These ten-year-old cows had the excellent average yield of 418 lb. butter-fat.

Havelock of Darbalara, one of the greatest bulls of the Dairy Shorthorn breed.

During the first eighteen years, 16.5 per cent. of 1,908 mature cows averaged 415 lb. butter-fat. More appreciation could well be directed to these splendid old cows by breeders and farmers alike, for they possess in high degree the essentials characteristic of longevity,

ONE *is "Made-To-Measure" for* YOUR *soil!*

All-Way-Traction



Sure-Grip

The Goodyear Tractor Tyre Line is the Most Complete in the World!

In the Goodyear line is JUST the tyre for YOUR conditions, whether heavy, wet clay, fine sandy soil or anything in between; one or another of these scientifically designed treads will do your work faster and better, and give you maximum savings in fuel, oil, labour, time, repairs and tractor depreciation—with correspondingly greater profits for your work. If you have ordered a tractor, or intend to buy one, give definite instructions to have it delivered on Goodyear Tractor Tyres. Ask your Goodyear Dealer or Tractor Agent to advise you on the tyre best suited to your work.

TERMS! Goodyear Tractor Tyres and Wheels are available on Hire Purchase Terms. For particulars write the Goodyear Branch (all capital cities).

GOODYEAR

TRACTOR TYRES

Send for interesting literature on the advantages of pneumatic tyres for tractors and farm machinery.
GOODYEAR TYRE & RUBBER CO., 23 THERRY ST., MELBOURNE.

Name..... Address..... A.M.119

10-T5-39

Law Somner's THOR-O-BRED BRAND PASTURE — SEEDS

The Thor-o-bred Tag on Every Bag

Scientific seed cleaning and testing by an improved modern machinery plant and laboratory equipment are assured to all users of Law Somner's seeds for sowing. Maximum germination and freedom from weeds, inert matter and dust, provide high quality and full-weight value with every bag bearing the L.S. Thor-o-bred Tag.

WE PAY FREIGHT

On all Cash Orders of £2 and over, bags are free and we will pay the Freight (goods train only) to any Station in Victoria.

L.S. DEPENDABLE STRAINS

Japanese Millet 2d. lb., 15/- cwt., 3 cwt. lots 14/- cwt.
Saccaline 4d. lb., 30/- cwt.
Sudan Grass 5d. lb., 37/6 cwt.
Imphee 6d. lb., 40/- cwt.
Thousand Headed Kale 2/6 lb.
Chou Mollier 2/6 lb.
"Pilca Butta" Lucerne 2/6 lb., 2/5½ lb. crop lots or more.
Rape, True Giant Kangaroo 9d. lb., 79/4 cwt. in ½ cwt. lots or more.
Rape, Dwarf Essex 8d. lb., 70/- cwt. in ½ cwt. lots or more.
Phalaris arundinacea—The new swamp grass, 4/6 lb., 4/- lb. in 7 lb. lots.

Special Prices for Large Quantities

LAW SOMNER PTY. LTD.

suppliers of

Reliable varieties of sure germinating seeds of high quality and purity

GOVT. CERTIFIED GRASS & CLOVER Seeds for Sowing

Victorian and New Zealand Rye-grasses; Early, Mid-season and Late Strains of Subterranean Clover, Cocksfoot, White Clover, Montgomery Red Clover, and *Phalaris tuberosa.*

Secure your supplies only from us of certified seeds bearing the

GOVERNMENT LABEL

LAW SOMNER

PTY. LTD.

21-23 Elizabeth Street, Melbourne, C.1
P.O. Box 1232, G.P.O., Melbourne, C.1

fecundity, and economic yields over many years. Each character is an essential one in a really great dairy cow, and though some other cows may possess the ability and be omitted only through failing to show it, that is no reason why those which have not failed should not be recognized. Reference to the comparative data from other sources indicates, in a fairly general way, that first, second, and third calvers should receive 30 per cent., 20 per cent., and 10 per cent. allowance respectively, on their lactations.

DATA OF VARIOUS INVESTIGATIONS CONCERNING THE RATE OF AGE DEVELOPMENT IN PRODUCTION OF DAIRY COWS.

Age Correction Factors found from Investigations where Various Breeds have been combined.

Age or Class of Animal.	American Dairy Herd Improvement Association. 4,000 cows.	Victorian Standard Herd Test, 26 year's Work. 2,467 cows.	Average of three Investigations by Rogdale, Davisdon & Fobreman, America.
Junior 2 ..	1·29	1·31	1·31
Senior 2 ..	1·21	1·15	1·24
Junior 3 ..	1·15	1·14	1·18
Senior 3 ..	1·10	1·10	1·13
Junior 4 ..	1·07	1·06	1·09
Senior 4 ..	1·04	1·04	1·07

Age Corrections used in Countries where Junior and Senior Records are merged into yearly work, and Calvings are reckoned Annually.

Year.	England. Age Factor.	British Columbia. Age Factor.
2 year old ..	1·30	1·30
3 year old ..	1·20	1·19
4 year old	1·10	1·09

A remarkable feature of these investigations is the almost general finding that a first calver is approximately 80 per cent. of mature form. Greaves and Forrum of America found that 2,367 Guernsey two-year-olds were 82 per cent. of maturity, while 3,633 Jerseys of the same age showed 78 per cent. of mature form. The standard herd test survey gives similar results. In every section of the Victorian survey, the senior two-year-old shows a higher relative yield than elsewhere. This is undoubtedly caused by the larger number of our first calvers, which calve again before three years of age.

The first "advanced register" published by the Victorian Department of Agriculture, is being posted to all dairy farmers competing in the Standard Herd Test and to all members of grade herd testing associations. Other persons desiring a copy, may obtain same free on request. The register includes, on this occasion, all cows that have qualified at any time, during the testing work of owners now in the standard test. In addition to supplying similar information concerning the stock of any breeder who may re-enter the test, the performances of each cow will, in future lists, be corrected to include any additional information that may become available. A perusal of the register shows that some prominent herd-test, and also show-ring cows, have failed, during any four consecutive years of their life, to reach the qualifying yield of 400 lb. butter-fat—even after age allowances have been added.

On the other hand, the performances of great cows like "Springhurst Tulip 2nd" and "Linga Longa Wattle Spec," with identical yields of 456 lb. butter-fat for eleven years, "Willow Park Blush" (twelve years, 440 lb.), "Glencorran Violetta," "G. Viola," and "Dookie Flora"—Ayrshires with many years of high average yields—are brought into prominence. Their claims to greatness can now be appreciated.

Mr. F. A. Williams' "Ballara Bonnie"—8 years average yield—596 lb. butter-fat.

Outstanding Cows and Herds.

The outstanding cows of the 27 years of standard test work are undoubtedly "Willow Park Cherry" and "Mornmoot Princess Madeira." The former is the only cow to capture the £100 grand champion herd test prize, while the latter was twice champion and

once reserve champion herd test cow. Cherry is also the champion "long distance" producer of all breeds, with an average yield of 599 lb. butter-fat over a ten-year period. Her fame is further enhanced by the fact that four of her daughters accompany her on the register, while two of her sons are among the very small group of bulls to sire four or more qualified daughters. A further test of merit is the capture, by the "Cherry" family, of all the Shorthorn class records of this State. Of the 34 Willow Park Shorthorns listed, all but two were sired by "Havelock of Darbalara," his sons, or his grandsons. Neither Cherry nor Havelock possessed breed quality in an unusual degree; they did, however, exhibit dairy aptitude, health, longevity, and reproductive ability unsurpassed in the history of the standard herd test.

Mr. Chirnside's great cow, "Mornmoot Princess Madeira," has the highest production attainment of any cow of all breeds. No cow has even closely approached her remarkable average yield; but time alone will prove whether she can attain a life-time yield equal to Mr. Atkinson's famous Shorthorn cow.

The Madeira family, which originated in the imported Jersey cow, "Madeira 5th," already has many remarkable achievements to its credit, while new laurels are at present being gained by young cows of this strain. "Ballara Bonnie" (seven years' average, 588 lb. butter-fat) is an offshoot of this family through her sire "Brucevale Lord Fancy Maderia"; both of her daughters exceeded 400 lb. butter-fat on their initial test performance.

The Banyule-bred cow, "Rintoul View Petal," has the second highest Jersey yield on the register. Her sire, "Banyule Triplane," has many other good daughters. "Jindivick Heroine 4th" represents a long line of tested stock. "Somerville Reputation," her sire, is a son of "Somerville Babs," one time empire champion junior four-year-old producer of the breed. The granddam of "Heroine 4th" was sired by "Heroic of Somerville," another son of the famour "Babs." Other great cows to show out prominently on the register are "Belgonia Peggy 6th," "Leven Brae Queenie," "Springhurst Narcissus" and her daughter "S. Sybil Narcissus," also "Finchley Canary" and "The Wattles Joy." Still other cows with claims to distinction are "Miss Guy of Tarnpirr" (eleven years, 534 lb. butter-fat), "Springhurst Tomato" (ten years, 511 lb.), "Victoria Nictitana," a Red Poll (eleven years, 407 lb.), and several "Willow Park" Shorthorns with many high yields of butter-fat.

The register contains the names of many great individuals of each breed. Their splendid yields over many years should be considered together with the environment in which the cows were tested. Several records that exceed 400 lb. butter-fat indicate a really good cow, but just whether she is a desirable source from

Three productive members of Messrs. Smith Bros. Sylvan Hills Stud:— The 19-year-old Duchess 4th of Goulburn, top left, and two of her daughters.

which to purchase a herd-sire can only be answered with satisfaction by a close inspection of the cow, and the family she represents.

The Friesian, Guernsey, and Ayrshire breeds have but small representation on the register in comparison with their great reputation. Some cows of these breeds possess splendid individual performances, but very few have a four years' "production attainment figure" of unusual merit. Each of these breeds has a definite contribution to make to the building up of the dairy herds of the State. The Friesian has a world-wide reputation to sustain, but if it is to make the progress that the breed deserves, it must provide more proof of its greatness on the dairy farms. Of the nine qualified Friesian cows, only two are owned by a dairy-farmer breeder. There are several fine cows at the Werribee Research Farm and the Salesian College. The only Guernseys to qualify are owned by Mr. A. Fixter, a dairy-farmer of Boisdale. They represent a breed that is making progress in Victoria. The attainment level of the yield for the register should be well within the ability of good average cows of this breed.

Mr. B Tomasetti's "Glencorren Foam"—7 years average yield—423 lb. butter-fat.

No less than 154 Ayrshire cows in America and Canada have life-time yields of 100,000 lb. milk and 4,000 lb. butter-fat; this is the feature that the breed must develop if it would commend itself to the cream producing dairy-farmers of this State. Mr. G. Fraser's "Bonnie Doon Snowdrop" leads the Ayrshire list with a qualifying yield of 521 lb., her best yield to date being 555 lb. butter-fat. The "Glencorran" stud of Mr. B. G. Tomasetti has several prominent cows in the register, while Dookie College, and Mr. Wm. Henderson's "Grasmere" stud, also have representatives.

It may be unfair to expect a dual-purpose breed like the Red Polls to compete on even terms with the definitely dairy breeds, and it should not be reckoned as a sign of inferiority

Mr. B. Tomasetti's "Glencorren Violetta"—8 years average yield—407 lb. butter-fat.

if such breeders accept a lower production attainment figure. In some countries, this is a recognized practice. According to Sanders, an English authority, Red Poll breeders have nothing to fear from other breeds on the score of longevity, for this was found to be a constant characteristic of the breed. All of the cows listed from this breed were bred at, or from stock developed at, the Werribee Research Farm. One remarkable family includes "Cutty" (a D class cow) and five of her descendants (nearly one-third of all listed cows of this breed).

It is perhaps inevitable that some animals would be excluded from any scheme. Some worthy cows failed to qualify by a few days, or a few pounds of butter-fat. It is also certain that some cows now appearing in the register would have failed to qualify had the proposed inspection clause been in force. A surprising feature of the list is that over 60 per cent. of the registered cows exceeded the 450 lb. level which was proposed for the special section of the register—such cows would have required the hallmark of the breed societies in regard to breed excellence.

There can be no doubt that some high yields have been much influenced by an unusually prolonged service period, and the frequently associated long period of pre-calving rest. It

should not be overlooked, however, that not always are such cows intentionally held out of calf, for it is known that some high yielding cows have short, mild, "heat" periods, and that this feature may be particularly pronounced in winter. Such cows may be easily missed by the herdsman or owner under these conditions. Such a cow was "Willow Park Fairy"; she was frequently unobserved, although carefully watched. There can be no doubt about her greatness, however; this is shown by her nine years' average yield of 609 lb. butter-fat. Several times she was exceeding 50 lb. milk daily at the completion of the test. Her son, by "Havelock of Darbalara," is also a most successful sire at "Willow Park." In all probability, other cows could have qualified if they had been more liberally fed or mated earlier; but concerning those cows which have qualified there can be no doubt, for the proof is supplied.

Among the herds represented on the register by many cows, the "Springhurst" stud and the "Willow Park" stud stand out conspicuously, while the "Sylvan Hills" Jersey stud with seven years of standard herd test experience has a fine showing. In "Duchess 4th of Goulburn"—a granddaughter of "Pretty Noble" (imp.)—the owners of the latter stud have a remarkable old-foundation cow. She is still in the herd at nineteen years of age despite her long life in the steep hills of South Gippsland. Upwards of 70 per cent. of the herd are her descendants, several of which appear on the register, while others were tested in association test for many years, and would easily qualify if those records were used. "Old Duchess" has thirteen test records which average 484 lb. butter-fat—some of which were made in association test. A feature of her yields is her high average test; a character expressed by so many close relatives of "Pretty Noble" (imp.). Most of the older cows in the herd are by a son of Tiddlewinks 2nd of Holmwood," reserve champion Jersey and herd test champion in 1919. "Somerville Heir Apparent," the herd-sire to follow, has more daughters on the register than any other bull of all breeds; he is by a son of the Empire champion producer "Babs of Somerville," and from "Somerville Northern Queen," a 622 lb. butter-fat cow. The owners of this stud—Messrs. Smith Bros.—feed their calves generously; their cows have good middles, good rumps, and good udders. They seek to breed utility Jerseys, and the success of their efforts is evident from the number of qualified living cows in the register.

Quality in Pasture Seeds—continued from page 504.

is realized that the presence of 1 per cent. by weight of seeds of the common curled dock (*Rumex crispus*) in a line of seed would mean the presence of 3,000 of these seeds in every pound of the seed sown. Thus, a seeding of 20 lb. per acre would result in the planting of 60,000 dock seeds, or about twelve seeds to each square yard. With smaller seeds, the number per pound for every 1 per cent. of infestation by weight would be correspondingly greater.

Variation in Lines of Seed.

In order to show the practical application of the above methods of seed valuation, the results of typical analyses on samples of perennial rye-grass and subterranean clover are given. The results of the purity tests are illustrated by a photo for each sample, in which the numbers indicate, 1. Original sample, 2. Pure seed, 3. Inert matter, 4. Weed seeds.

The two pasture species for which examples have been given above are the kinds most commonly dealt in, and the results show how very greatly samples may vary in actual value. The two low-value samples described are in no way exaggerated, and may be taken as quite representative of what has often been offered for sale, sometimes as "farmer's dressed" or "seconds," but more usually without any qualification. At the present time, the sale, or the offering for sale, of seed of such low quality would be an offence against the Victorian Seeds Acts. The operation of these Acts is described in another article in this Journal (see page 531).

Ready Made Seeds Mixtures.

The method of valuing seeds as described can only be simply applied to a choice between two or more lines of the one kind of seed. The valuation of mixtures is more difficult and complicated, and, moreover, prepared mixtures are often a means of disposing of inferior seed, as it is more difficult to detect impurities present in a mixture than in seed of a single kind.

The best advice that can be given is to avoid altogether the purchase of such mixtures, and to buy the seed of each kind required separately. In this way, the best available seed of each species can be selected, and a mixture for sowing made up in the desired proportions.

Mallee Research Station, Walpeup

Experiments and Results

By W. B. Miller M.Agr.Sc., Senior Inspector of Agriculture, H. L. Hore B.Agr. Sc., Inspector of Agriculture, and H. J. Sims B.Agr.Sc., Manager*

Visitors at the Mallee Research Station Walpeup, Field Day, Oct. 20th, 1939.

THE Victorian Mallee districts, which cover approximately 11 million acres, or one-fifth of the State, are devoted mainly to wheat growing, with sheep as a valuable adjunct. By the establishment of the Mallee Research Station at Walpeup in 1932, the conduct of research, experiment and education into the problems of the Mallee wheatgrower has been extended and intensified by a resident staff.

This report on the results obtained over the past seven years summarizes the activities of the Station, and indicates its scope.

The policy was adopted of locating the experiment station at the geographic and climatic centre of the Mallee, and of supervising the associated district plots by the staff resident at the central institution. Before adopting Walpeup, the advantages and disadvantages of twelve areas in various parts of the Mallee were reviewed. Th factors in favour of Walpeup were—(*a*) its cenetral situation; (*b*) climatic conditions there are average, avoiding the region of highest rainfall in the south and the region of lowest and most unreliable rainfall in the extreme north-west; (*c*) the soil was virgin, and comprises a range of five important types; and (*d*) portion of the area had been under experimental plots for a number of years.

Accordingly an area of 1,928 acres of Crown land 1½ miles from the Walpeup township was selected and permanently reserved for use as an experiment station by the Department of Agriculture. As it was intended, the station is serving as a centre for research and investigation into wheat-growing and allied problems in the Mallee, and it is supported by experimental plots conducted by the Department at Swan Hill and Werrimull, where results obtained at Walpeup will be confirmed and demonstrated under local conditions. Further plots of this nature will be established as opportunity offers.

The work of development so far has consisted chiefly in preparing for cultivation the homestead block of 638 acres, the Kattyoong Block of 280 acres, and 106 acres in the Paignie Block. An area of approximately 760 acres is now available for cropping. A broad scale timber and soil survey of the whole farm is being carried out as the development continues.

* *Manager of the Station 1932-1938.*

Experimental work is being conducted on a large scale. This year 125 acres are sown to various plots, there being 78 acres of wheat plots, mostly on fallow, 30 acres of oat plots, principally on stubble, and 17 acres of pastures.

Bulk crops consist of approximately 140 acres of wheat and 173 acres of oats. Oats are sown on stubble for hay and on fallow for grain production. The bulk cereal crops for grain comprise the following varieties :—

Wheat—Regalia, Ghurka, Ranee 4H, Sepoy, Baldmin and Bencubbin.

Oats—Mulga and Dawn.

The grain obtained from these areas will be available for distribution among farmers as graded seed. Special precautions are taken to maintain its purity and trueness to type.

Of the wheat varieties being grown for seed Ghurka, Ranee 4H and Sepoy are well known to Mallee farmers. Regalia was released by the Department in 1938 and is the cross-bred wheat formerly known as Ranee x Free Gallipoli W5807. Of an early maturing type, it has proved its ability to yield well under Mallee conditions and closely resembles Ranee 4H in appearance.

Baldmin is an early maturing variety which usually produces vitreous grain and flour of medium-strong quality. It is inclined to be weak in the straw and should be harvested promptly after ripening. Bencubbin is the leading wheat variety in Western Australia and is gaining in popularity in the drier portions of Victoria. It is a tall, fairly early maturing variety which, under some conditions, is definitely weak in the straw. It is resistant to flag smut and is considered the most suitable dual-purpose (grain or hay) type for the Mallee.

To meet the demand from farmers for seed of the oat varieties Mulga and Dawn, larger seed areas of these varieties were sown this year.

District Seasonal Conditions.

This season promised to be one of the most favorable experienced in the Mallee during the past 15 years. The weather during January was hot, dust storms were frequent and rainfall well below the average. These conditions continued until the end of February when good rains were received. A fall of 318 points at this time produced a good germination of weeds on fallows and stubbles and enabled farmers to work their ground in preparation for seeding.

Only 12 points of rain were recorded during March and by the end of the month stubbles had dried out. Dry sowing of oats commenced early in April, and following 174 points of rain on the 13th of that month germination was satisfactory. Sowing proceeded steadily from this date and further rains in April and May ensured a good germination of all crops. Owing to the moist conditions, the killing of weeds was a greater problem than usual.

June was a very mild month with good rains, and crops made rapid growth. July rainfall, although below normal, was ample for requirements. A series of frosts during this month considerably checked growth. The September rainfall, however, was well below average, and combined with windy weather, this adversely affected the crops. Heavy spring rains will be necessary if satisfactory yields are to be obtained.

The monthly rainfall for the present year, and averages over 27 years are as follow :—

Month.	1935.	1936.	1937.	1938.	1939.	Average 27 Years.
January ..	34	274	165	125	13	65
February ..	2	5	18	49	343	81
March ..	71	26	135	..	12	82
April ..	89	120	6	81	222	72
May ..	59	108	68	2	135	127
June ..	114	66	192	36	183	130
July ..	118	256	71	167	87	116
August ..	72	94	223	51	150	135
September.	106	11	48	6	47	141
October ..	173	161	275	8	..	144
November..	14	24	19	9	..	85
December ..	47	100	124	2	..	101
April-Oct.	731	816	883	351	..	865
Total ..	899	1,245	1,344	536	..	1,279

Summary of the Tests.

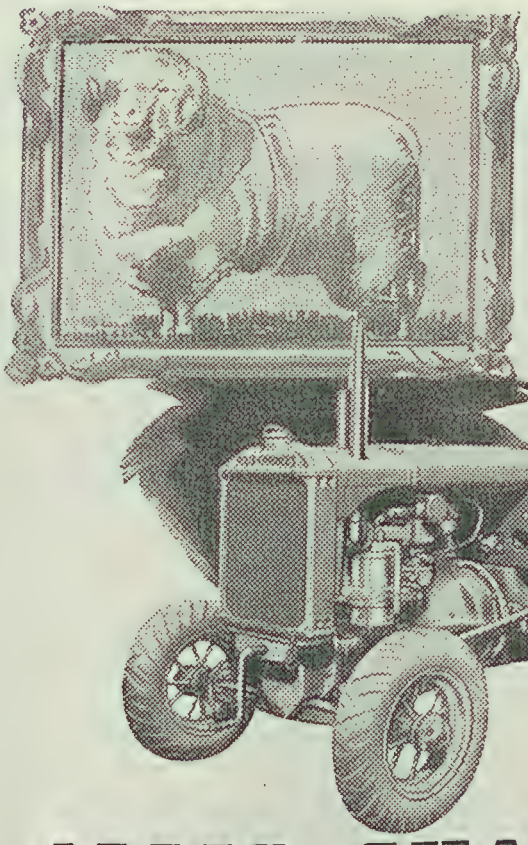
Prior to 1932, the experiments at Walpeup had been confined to comparisons of wheat and oat varieties and manurial trials, sown during May. As the time of sowing has a considerable effect on the yields obtained, it is desirable that the optimum time of sowing for each variety should be determined. Similarly different results may be had for varying amounts of manure when the crop is sown early or late. For this reason all the major trials have been sown at three different times. The experiments this year include—

A. *Experiments with Wheat (on fallow)*—

(1) Manurial trials, sown early, mid-season, and late.

(2) Variety trials, sown early, mid-season, and late.

(3) Rate of seeding trials, sown early, mid-season, and late.

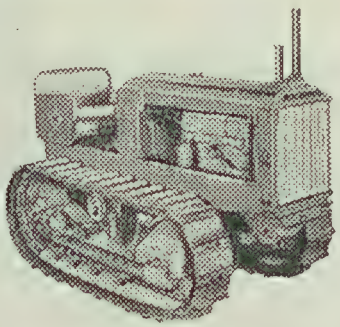


BLUE BLOODS. BOTH!..

ALLIS-CHALMERS

Down through the years the world's stud books have reflected the untiring patience and endeavour of breeders who strive for ultimate stock perfection. Similarly, the immense plants of Allis-Chalmers have devoted nearly 100 years to producing the perfection in tractor engineering. An example of the excellence of its products is pictured above—the Model U air-tyred tractor.

Here's a tractor with plenty of reserve power for peak loads . . . strong, rugged and compact! The Model U has four forward speeds, including three working speeds of 2½, 3¼ and 4½ miles per hour and a road speed of 10¾ miles per hour. For hauling on the road and about the property, or for travelling between jobs, the time and money-saving advantages of the high 10¾ miles gear cannot be over-estimated. More work is done—less time wasted—and the paddock work is completed sooner. Write us for illustrated particulars of the Model U.

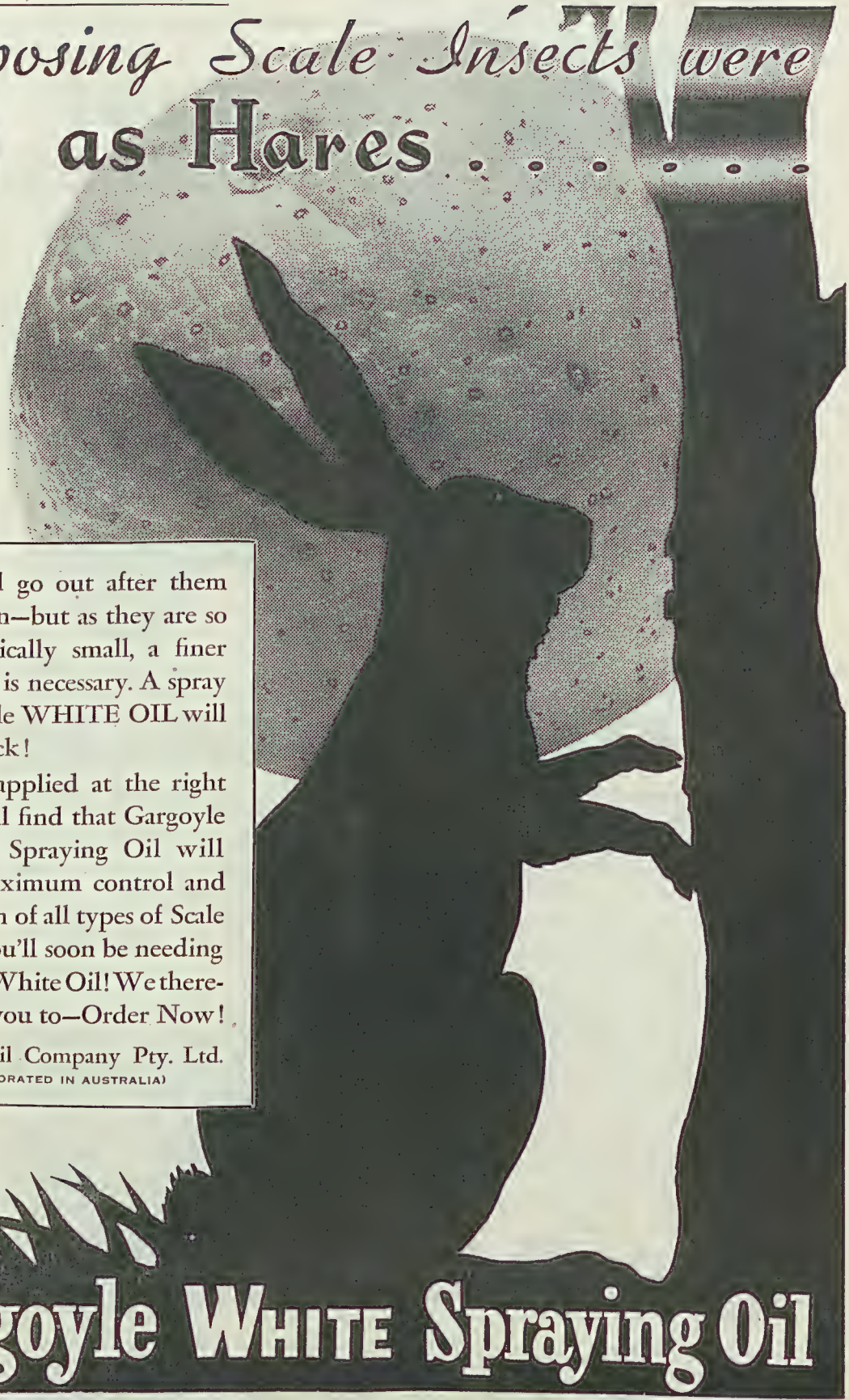


On the right you see the Model M track-type tractor—one of thousands in use throughout the world. It has been tried, tested and proved under every conceivable farming condition. The Model M is designed for general field work, with 12 or 14-inch tracks, convenient drawbar and ample ground clearance.

LANES MOTORS PTY. LTD.

89 EXHIBITION STREET, MELBOURNE .. CENTRAL 10490

Supposing Scale Insects were Big as Hares . . . . . .



. . . you'd go out after them with a gun—but as they are so microscopically small, a finer technique is necessary. A spray of Gargoyle WHITE OIL will do the trick!

Properly applied at the right time, you'll find that Gargoyle WHITE Spraying Oil will ensure maximum control and destruction of all types of Scale Insects. You'll soon be needing Gargoyle White Oil! We therefore urge you to—Order Now!

Vacuum Oil Company Pty. Ltd.
(INCORPORATED IN AUSTRALIA)

SP 96

Gargoyle WHITE Spraying Oil

(4) Time of seeding trials.
(5) Cultivation trials.
(6) Mineral deficiency trial.

B. *Experiments with Wheat (on stubble land)*—
(1) Variety trial.
(2) Manurial trial.

C. *Experiments with Oats (on wheaten stubble land)*—
(1) Variety trials—(*a*) for hay; (*b*) for grain.
(2) Manurial trials, nitrogen and super.
(3) Residual manurial trials.
(4) Rate of seeding trials.
(5) Oat grazing and recovery trials.
(6) Method of sowing trial.

D. *Experiments with Oats (on fallow)*—
(1) Manurial trial.
(2) Variety trial.

E. *Trials of New Selections and Crossbreds*—
Stud plots and selection rows and plots of new selected and hybrid varieties of wheat, oats, and barley.

F. *Wheat Diseases Investigations*—
(1) Trials to determine the susceptibility of standard and new varieties to the wheat disease, flag smut.
(2) Trials to determine the effect of various manures and other factors on the infection of flag smut.

A group of visitors listening to an address by an officer of the Department.

(3) Genetic studies—an investigation into the inheritance of flag smut in wheat.
(4) Ball smut (bunt) control by means of various pickling powders.
(5) Trials to determine the effect of various pickling powders on germination and growth of the wheat plant.
(6) Loose smut control trials by means of modified hot-water treatments.

G. *Investigation into Possible Fodder Crops and Pastures for the Mallee*—
(1) Lucerne Trial—to investigate factors affecting lucerne establishment under Mallee conditions.

Sheep grazing on experimental plots at Walpeup.

(2) Pasture Species Trial—testing promising varieties under field conditions.
(3) Plant Nursery—preliminary testing of new pasture species.
(4) Plant selections—selections of plants made for local conditions.

H. *Permanent Rotation Trials embodying two, three, and four course rotations.*

I. *Sand-drift Investigations and Cultivation Trials—*
(1) Control measures on cultivated lands.
(2) Control measures on non-cultivated lands.
(3) Border control methods—to protect essential services.
(4) Technical Investigations—to study the basic causes of erosion.

Layout of the Experiments.

In order that different soil conditions should not affect the comparison between plots it was found advisable to replicate or repeat each plot in a trial. Each treatment or variety was sown once in a block of plots and the whole block repeated at least four times. This method is termed the Randomised Block system. The results obtained by it apply only to one set of conditions such as different varieties all sown with the same amount of manure, or manurial trials with one variety. In view of the importance of the many varying conditions such as time of sowing, rate of seeding, and manurial dressing applied, on the relative yields of the different treatments, it is of interest and importance that these varying features should be incorporated in each trial.

Accordingly, the present system of sowing the plots includes modifications along these lines and a number of composite trials have been sown. Among these are varieties sown at a number of seeding and manurial rates, and manurial trials under varying times and conditions of seeding. This type of experimental layout is a modification of the Randomised Block method and is known as a Factorial Design. Under this system, not only can the response be measured under each different condition tested, but also the studied results of the whole experiment should give a very reliable indication of the merits of the different treatments.

The extensive nature of the work performed this year is indicated by the following summary of the plots sown in each section: —

Wheat plots (manurial, variety, &c.)—1,507 plots.
Oat plots (variety, manurial, observation, grazing, &c.)—515 plots.
Barley plots—34 plots.
Stud rows—2746 rows.

The field in which the main section of wheat plots is located this year was originally covered with mixed timber, belar, pine, mallee, &c., and a portion was plain country.

EXPERIMENTS WITH WHEAT.

Wheat Manurial Trials.

This year's manurial trials with wheat were sown under the factorial design previously de-

A view of the permanent rotation field.

scribed, and each of the six quantities of superphosphate tested was included with the (*a*) early (April 19th), (*b*) mid-season (May 19th), and (*c*) late (June 14th) sowings. In addition, each manurial rate was tested at 20, 40, and 60 lb. of seed per acre.

The results of the 1933–38 trials are set out in Table I., and show clearly the marked response to superphosphate at each time of sowing.

An economical implement shed at the Mallee Research Station.

TABLE I.—WHEAT MANURIAL TRIALS, AVERAGE SIX YEARS, 1933 TO 1938.

Treatment.	Sown Early.	Sown Mid-Season.	Sown Late.	Average Three Times of Sowing.
	bus./ac.	bus./ac.	bus./ac.	bus./ac.
No manure ..	23·3	24·0	18·7	22·0
Super. 30 lb. p.a.	26·6	26·6	21·7	25·0
,, 60 lb. p.a.	29·3	28·0	23·0	26·8
,, 90 lb. p.a.	30·2	28·7	24·0	27·6
,, 120 lb. p.a.	31·2	29·6	24·9	28·6
Average yield	28·1	27·9	22·5	..

It will be seen by an examination of the preceding table that an increase in the yield of wheat was obtained with each addition in the amount of superphosphate applied. During the last three years dressings of 150 lb. per acre were included in this test, in order to determine if a further increase in yield was obtainable. The results are shown in the following table :—

TABLE II.—WHEAT MANURIAL TRIALS, AVERAGE THREE YEARS, 1936 TO 1938.

Treatment.	Sown Early.	Sown Mid-Season.	Sown Late.	Average Three Times of Sowing.
	bus./ac.	bus./ac.	bus./ac.	bus./ac.
No manure ..	27·8	27·3	20·7	25·3
Super. 30 lb. p.a.	31·6	29·9	22·4	28·0
,, 60 lb. p.a.	33·5	30·8	23·2	29·2
,, 90 lb. p.a.	34·1	30·9	24·2	29·7
,, 120 lb. p.a.	34·7	31·6	25·3	30·5
,, 150 lb. p.a.	34·5	31·5	25·8	30·6
Average yield	32·5	30·0	23·6	..

The application of 150 lb. of superphosphate per acre did not materially alter the yield from that obtained with 120 lb. per acre.

The results of the manurial trials at Walpeup over the last fourteen years are set out in Table III. This table shows the increased returns which may be expected from the various applications of superphosphate when wheat is valued at 2s. 6d. per bushel at country sidings, and superphosphate at £4 6s. per ton on the farm.

TABLE III.—WHEAT MANURIAL TRIALS.—AVERAGE RESULTS 14 YEARS.—MID-SEASON SOWING.

—	Average Yield 14 Years.	Increase due to Super.	Value of Increase at 2s. 6d. per Bushel.	Cost of Super. at £4 6s. per ton.	Extra Return per Acre, due to Super.
	bus./ac.	bus./ac.	s. d.	s. d.	s. d.
No Manure ..	18·6	..	..	..	..
Super. 30 lb. p.a.	21·4	2·8	7 0	1 2	5 10
,, 60 lb. p.a.	22·9	4·3	10 9	2 4	8 5
,, 90 lb. p.a.	23·8	5·2	13 0	3 6	9 6
,, 120 lb. p.a.	24·3	5·7	14 3	4 8	9 7

From these results it appears that, under conditions similar to those at Walpeup, the most profitable dressing for wheat on fallow is about 90 lb. per acre, when wheat on the farm is valued at 2s. 6d. per bushel.

Under the unfavorable seasonal conditions of 1938, each application of superphosphate up to and including 90 lb. per acre, progressively increased the yields over those obtained from the "no manure" plots but the increases obtained were not so marked as in previous years. Applications of super. above 90 lb. per acre last year

Note—The yields per acre quoted in this report are those actually harvested from the plots. Such yields are considerably higher (up to 20 per cent.) than would be the case if it were not necessary to have paths between the plots.

maintained the increase in yield obtained with that dressing but the yields were not appreciably higher.

In addition to the manurial trials on fallow land, tests with superphosphate on stubble land were commenced in 1937. This section of plots will provide a valuable guide to manurial applications for stubble sown wheat crops.

The results obtained to date indicate that, when sown on stubble ground which has been adequately manured with the preceding crop, wheat, like oats, does not respond to heavy dressings of superphosphate. Applications of 30 to 40 lb. per acre appear to be all that is warranted.

TABLE IV.—WHEAT MANURIAL TRIAL. STUBBLE GROUND.

Average results 2 years, 1937–38.

Treatment.	Yield.
	bus./ac.
No manure	6·0
Super. 30 lb. p.a.	7·2
„ 60 lb. p.a.	6·9
„ 90 lb. p.a.	6·9

The discovery that optimum plant growth is produced only when there is present in the soil, in addition to the more commonly recognized essentials, small amounts of certain minerals other than phosphate, nitrate, and potash, has greatly widened the scope of experimental work in recent years. It is indeed fortunate that, because these minor elements are needed only in small amounts, they are usually present in sufficient quantities in most soils, and the occurrence of deficiency areas is therefore relatively rare. Recent work, however, has indicated that a number of areas in Australia respond to the application of one or the other of these minor elements and the Department is investigating many districts in Victoria from this point of view.

In order to determine if the Mallee district of this State is possibly one of these deficiency areas, a "minor element" trial was commenced at Walpeup in 1938. A series of wheat plots was sown on fallow land with a basal dressing of 90 lb. of superphosphate per acre and, in addition, various minerals were added when sowing certain plots.

The results obtained at Walpeup in 1938 (Table V.) give no indication of increased yields due to the addition of these minerals.

TABLE V.—MINOR ELEMENT TRIAL, WALPEUP, 1938.

Sown mid-season.

Treatment.	Yield.
	bus./ac.
Super. 90 lb. + Zinc sulphate 20 lb. p.a.	16·1
„ „ „ Manganese sulph. 30 lb. p.a.	16·1
„ „ „ Potassium sulph. 90 lb. p.a.	16·1
„ „ alone	15·9
„ „ + Magnesium sulph. 30 lb. p.a.	15·8
„ „ „ Copper sulph. 15 lb. p.a.	15·1
„ „ „ Iron sulph. 56 lb. p.a.	14·2
„ „ „ Borax 15 lb. p.a.	11·5

NOTE.—A yield difference of 1.2 bushels per acre is necessary for significance between treatments.

These investigations are being continued this year and the effect of the above minerals on both wheat and oats is being tested. Care should be exercised in the use of some minor elements as their indiscriminate application may prove detrimental both to the crop and the soil to which they are applied.

Cereal Breeding and Development.

The production of new superior varieties of wheat, oats, and barley by hybridization and selection, and the subsequent development and testing of these forms, provide one of the most important and extensive aspects of the research work being conducted at the farm. Each year a large number of matings of desirable parents is made, and the progeny of these are grown and studied in nursery rows in the stud Cereal Plots. These rows are subjected to a drastic culling, and only those plants exhibiting desirable characters are retained for further selection and testing.

This selection work is continued for a number of years until only a few of the more promising true breeding strains of the original population are left. These are then grown in seed multiplication plots and finally pass to the larger field plots for accurate testing to determine their yielding capacity.

Varieties considered worthy are finally tested over a period of years in exhaustive replicated yield trials repeated in each season at three times of sowing, viz., early (April), mid-season (May), and late (June).

The success achieved by wheats such as Ranee 4H and Ghurka in the past illustrates the value and possibilities of varietal improvement. When the best of the new crossbreds now growing at the Station are distributed, still greater progress will be made.

TABLE VI.—TEN PRINCIPAL VARIETIES SOWN IN THE **MALLEE** 1938-39—PERCENTAGE OF TOTAL WHEAT AREA.—(1937-38 FIGURES IN BRACKETS).

Variety.	Percentage.
Ghurka	42·9 (40·9)
Rance (including 4H) ..	30·1 (31·2)
Free Gallipoli	6·2 (8·5)
Bencubbin	4·2 (3·1)
Dundee	4·2 (2·2)
Sepoy	3·8 (4·5)
Rajah	2·1 (2·3)
Bobin	1·8 (1·6)
Nabawa	1·1 (1·5)
Mac's White	1·0 (0·9)
All others	2·6 (3·3)
Total wheat area ..	1,375,429 acres

Ghurka and Rance 4H have been the principal varieties recommended and grown in the Mallee in recent years, while smaller areas have been sown with Free Gallipoli, Sepoy and Rajah. Rance 4H is sown chiefly in the northern Mallee, while Ghurka is more popular further south.

Work over the past three years has demonstrated the possibilities in the Mallee of Baldmin, Bencubbin, and Regalia (formerly known as crossbred Rance x Free Gallipoli W5807 J5–1–1).

At the Mallee Research Station, Walpeup, the superiority of Baldmin and Bencubbin has been marked, while at Swan Hill and Werrimull they yielded as well as the standard varieties.

Regalia has given high yields at each of the Mallee experimental centres and, as it is the best of the very early maturing types and definitely superior to Rajah in straw characteristics, it should be tried on bulk areas, particularly in the northern Mallee.

Typical heads of Regalia.

Milling and baking tests indicate that, so far as quality is concerned, Baldmin regularly produces medium strong flour, Bencubbin is superior to both Rance 4H and Ghurka as a low strength wheat, while the grain quality characteristics of

Wheat observation plots at the Mallee Research Station.

Wheat Variety Trials—Mallee Research Station.

Regalia closely resemble those of Ranee 4H, are superior to those of Ghurka, and very superior to those of Rajah.

Three of the last four years have been characterized by a dry period early in the spring, followed by good rains later in the season. Consideration of the frequency of such seasons in the Mallee shows that approximately only one-third conform to this type. In view of this, the Department considers it unwise for farmers to depart substantially from the standard recommendations, Ranee 4H and Ghurka for main sowing in the Mallee. Baldmin and Bencubbin should be restricted to limited areas until more evidence is available as to their behaviour under Mallee conditions. Both exhibit a tendency to weakness in the straw.

In the southern Mallee districts bordering on the Wimmera, Dundee, a medium strong wheat, is worthy of trial on limited areas, while Free Gallipoli is still recommended as the most profitable of the older varieties to grow where Ghurka or Ranee 4H are regarded as comparatively unsuitable for specific conditions.

The varieties recommended for the Mallee are :—

——	Main Sowing.	Limited Sowing.
Northern Mallee	Ranee 4H Ghurka	Regalia Baldmin Bencubbin Sepoy
Southern Mallee	Ghurka Ranee 4H	Baldmin Dundee Regalia Free Gallipoli

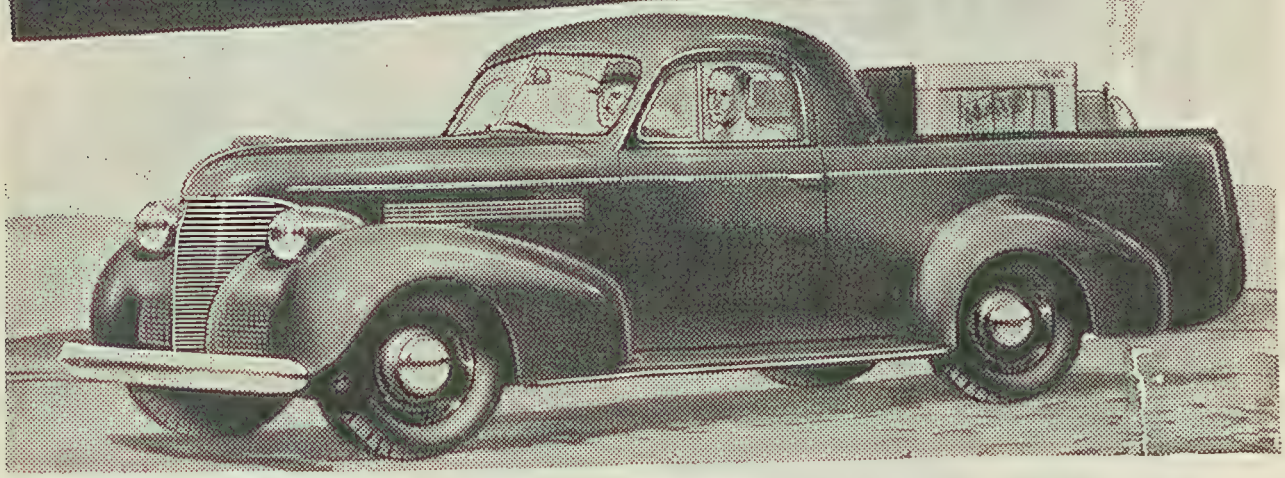
TABLE VII.—WHEAT VARIETY TRIALS IN THE MALLEE.

Yields in bushels per acre.

	Mallee Research Station—Walpeup.			Swan Hill.		Werrimull.		Carwarp.	Rainbow.		Manangatang.
	Average, 13 Years, 1925–38.	Average, 6 Years, 1933–38.	Average, 4 Years, 1935–38.	Average, 8 Years, 1931–38.	Average, 4 Years, 1935–38.	Average, 7 Years, 1932–38.	Average, 3 Years, 1936–38.	Average, 8 Years, 1923–31.	Average, 8 Years, 1929–36.	Average, 2 Years, 1935–36.	Average, 5 Years, 1926–31.
Ranee 4H	23·5	27·3	29·6	24·3	25·6	17·6	15·2	14·2	21·7	27·4	12·1
Ghurka	21·5	22·4	21·8	24·8	24·0	17·7	13·1	14·8	23·9	29·8	11·9
Regalia	..	28·0	29·8	..	25·2	..	16·4	..	..	30·0	..
Baldmin	..	..	32·3	..	24·3	..	15·0	..	..	..	..
Bencubbin	..	29·0	31·9	..	25·2	..	14·6	..	..	25·6	..
Dundee	..	..	28·0	..	22·6	..	13·7	..	..	..	..
Sepoy	22·7	24·3	24·6	25·4	26·2	17·6	14·4	15·1	..	..	11·4
Free Gallipoli	..	..	..	25·2	25·5	..	..	13·8	21·5	26·3	10·8

NOTE.—Ranee 4H replaced Ranee from 1928 onwards.

FACTS PROVE 1939 CHEVROLET THE *BEST UTILITIES EVER BUILT



CHECK THESE POINTS WITH YOUR NEAREST CHEVROLET DEALER . . .

TEST them on any job—check the facts—and you'll prove that Chevrolet has the most advanced engineering and design, the greatest measure of comfort, safety and economy, the most attractive styling ever built into a low-priced full-sized Utility.

BEST ENGINEERING.—Chevrolet's famous 6-cyl. Overhead Valve Engine (which never needs replacing) gives you the most economical power for fast haulage. And look at these highlights of Chevrolet construction: Vacuum-assisted Safety Gear Shift (Master de Luxe), Synchro-mesh Gears, Tiptoematic Clutch, Finger-tip steering, "Full Contact" Hydraulic Brakes and "Pilot-Seat" Driving Vision with its amazing increase in visibility.

BEST FOR HANDLING BULKY LOADS.—You handle the bulkiest loads easily in the new Chevrolet because load space has been increased by more than 12 per cent. Floor length is now 85½ inches; Floor width 55¼ inches, and depth of sides 21½ inches (Open Utility).

BEST FOR COMFORT.—The 1939 Chevrolet Utility is as useful for pleasure trips as it is for hard work. Roomy "Turretop" Coupe Cabs give passenger car comfort. Perfected Independent Front Wheel Springing (Master de Luxe); new and softer leaf springing (Standard) and new "Dual-rate" rear springing give wonderfully smooth riding with or without loads.

BEST VALUE FOR MONEY—Weigh the money value of Chevrolet's features against its low first cost and you'll prove that Chevrolet offers Australia's best Utility proposition. Body types available are: Open, Wellsides, Flaresides and a stylish, steel-roofed Panel Van.

CHASSIS PRICES FROM £255

A full range of Chevrolet 15 cwt. "Commercials" also available. Chassis from £247.

Easy terms available under Confidential G.M.A.C. Plan

A General Motors Value.

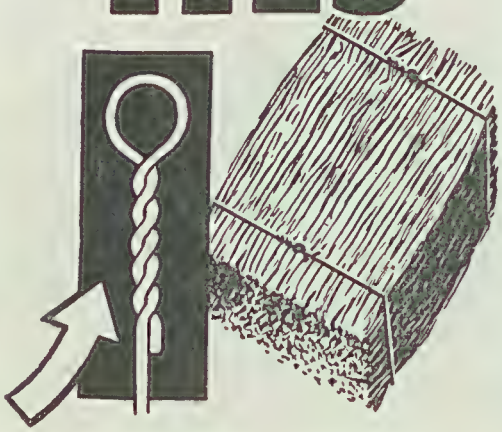
CHEVROLET *Utilities FOR 1939*

CONSULT YOUR LOCAL AUTHORISED CHEVROLET DEALER

Sold and Serviced by Chevrolet Dealers Throughout Australia

GENERAL MOTORS-HOLDEN'S LTD.

BALE TIES



ONE END LOOPED READY FOR TYING

Save Time and Money by Using

PREPARED BALE TIES

Made in Black and Galvanized Wire, cut and straightened to any required length. Packed in bundles of 250.

- NO WASTE
- EASIER and QUICKER THREADING
- CHEAPER COSTS
- MORE CONVENIENT

Manufactured and Distributed by

GERRARD WIRE TYING MACHINES Co. Pty. Ltd.

18-24 Ireland Street, West Melbourne, C.3
269-271 Sussex Street, Sydney
Makerston Street, Brisbane
Molton Street, Adelaide

WHAT SHALL WE DO ABOUT WORMS IN SHEEP?

The man who feeds Tri-cal-os advises—

"Sheep will withstand the effects of worms only if they have been well fed and have had a good mineral lick before them always. I recommend Tri-cal-os Bone Flour—the sheep find it palatable and it keeps them in tip-top condition."

Particulars about

TRI-CAL-OS

Sterilized

BONE FLOUR

from

DAVIS GELATINE PTY. LTD.,
G.P.O., Box 4058, MELBOURNE

Variety tests in the past have resulted in the elimination of many older wheats, such as Federation, Early Gluyas, Mac's White, Yandilla King, Currawa, Joffre, Nabawa, Rajah, and Bobin.

The varieties retained in the 1938 final tests are shown in Table VIII., while others not quite so far advanced are shown in Table IX.

TABLE VIII.—WHEAT VARIETY TRIALS (REPLICATED), AVERAGE YIELD, 1938.

Variety.	Sown Early.	Sown Mid-season.	Sown Late.	Average.
	bus./ac.	bus./ac.	bus./ac.	bus./ac.
Bencubbin	25·5	26·7	23·1	25·1
Regalia	28·0	24·0	22·3	24·8
Ranee x Gallipoli W5899 J5–1–1	27·8	24·8	21·5	24·7
Ranee 4H	26·5	25·0	21·2	24·2
Free Gallipoli x Ranee M4043 S4–1	22·5	26·9	21·7	23·7
Baldmin	25·7	24·5	19·9	23·4
Gular	22·4	26·6	18·4	22·5
Dundee	22·6	23·7	16·0	20·7
Sepoy x Gallipoli W4081 L6–1	29·1	18·7	17 8	21·9
Major x Free Gallipoli W5817 J5–2–2–8 ..	30·1	17·8	17·6	21·8
Ghurka Selection W595 O5	31·9	17·2	16·2	21·7
Major x Free Gallipoli W5817 J5–2–2–4 ..	27·8	15·8	16·4	20·0
Sepoy	26·2	15·6	17·8	19·9
Ghurka	27·9	16·1	14·2	19·4
Major x Ranee W6025 K1–1–1–2	26·4	14·7	14·4	18·5
Free Gallipoli x Sepoy L5053 B2	22·5	14·2	15·5	17·4

In addition to the varieties tested in the above major trials, a further test with new promising crossbreds and new or leading wheats from other states, is sown each year. In the past this trial (Table IX.) has included several wheats of superior milling quality such as Carrabin, Ford, and Baringa, but their yielding ability under Mallee conditions was much inferior to that of the standard wheats and they were dropped from the tests. Several crossbred wheats showing promise of combining high yielding capacity and other desirable field characteristics with good milling qualities are now included in the tests. The plots are sown at two different times with 60 lb. of seed and 90 lb. of super. per acre.

TABLE IX.—NEW CROSSBRED AND VARIETY TRIALS (REPLICATED), AVERAGE YIELD, 1938.

Variety.	Sown Early. bus./ac.	Sown Late. bus./ac.
Ghurka x (C x M x G) W5543 P4–2L1 ..	26·0	15·8
Major x Ranee W6021 K1–1–1–2 ..	25·2	17·1
Ranee 4H	25·2	16·7
Nawab	24·3	17·7
Merredin	22·2	15·7
Federation x Free Gallipoli L4098 S5–1	21·8	17·9
Sword	21·8	13·1
Free Gallipoli x Rajah M4061 S2–1 ..	21·6	16·3
Rajah x Gallipoli W6491 H2–4–3–4 ..	21·5	17·5
Ranee x Free Gallipoli W5899 J1–1–2	21·3	15·7
Ghurka x C.M.G. W5543 P4–1 L1 ..	21·1	16·4
Totadgin	20·8	18·2
Ghurka x C.M.G. W5530 P2–2–2	20·2	13·9
Curr. x Major x Gall. W7319 F3–4–1–2 ..	20·1	14·7
Free Gallipoli x Wannon W4073 L10–1	19·9	16·0
Riverina	18·8	16·2

As an appreciable proportion of the wheat crop in the Mallee is sown each year on stubble land, the area varying considerably according to seasonal conditions but usually in the vicinity of 15 per cent. of the total area sown to wheat, variety trials on stubble land have been introduced. The results obtained so far indicate that for stubble sowing an early maturing wheat is desirable.

[*Continued on page 535.*

Stud Rows of Wheat and Oats.

Vegetable Culture

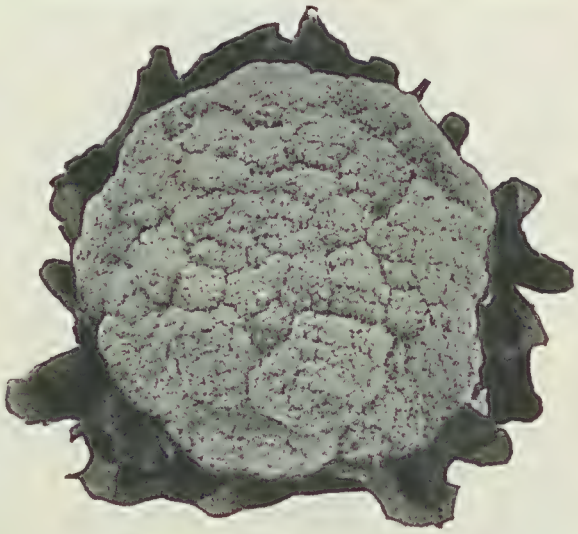
By A. W. Jessep, M. Agr. Sc., B.Sc. Dip. Ed., Principal, School of Primary Agriculture, Burnley

A few years ago market gardening was considered a lowly type of occupation and the persons so engaged had practically no capital or organization, the work being carried out by rather primitive methods. The work of the market gardener was not appreciated, and little or no thought was given to production. The vegetable growers of the present day have their own trading organization, and methods of cultivation have been improved considerably.

The importance of this phase of agriculture may be gauged from the fact that, in the Commonwealth there are 60,000 acres occupied by market gardens, and the gross value of their products is in the region of £2,500,000. This represents about £40 per acre per annum, but the average market gardener does better than these figures indicate. In Victoria, market gardens occupy 20,728 acres and, in addition, there are many small areas of 1 acre or less which are not recorded officially. The average return is about £50 per acre or £1,000,000. The potato, onion, carrot, parsnip, turnip, and beet crops, when grown in lots of more than 1 acre are not included in the above figures. They are tabulated separately by the Government Statist.

Vegetables often are cheap and the householder sometimes wonders whether or not it is worth while bothering to grow them. For the person who dislikes gardening this may be a valid excuse, but to be able to go out the back door into the garden and pick fresh, crisp vegetables makes it worth while. Further, they are rich in vitamins, mineral salts, and roughage, all of which are necessary for normal, healthy development of the body.

The vegetable garden has many attributes. It may reduce the family bill and, in addition, the excess vegetables may be sold and so become a source of income, particularly to the younger members of the family. Fresh, attractive, high quality vegetables are available at the time they are needed.



In some cases, vegetables may be a suitable substitute for more expensive foods. A large bowl of lettuce, tomatoes and young onions also may help the housewife out of a difficulty should visitors arrive unexpectedly.

Vegetables provide a healthy, well-balanced diet The garden provides healthful exercise for those engaged in indoor work all day, and develops an interest in growing things amongst the children. The child may soon be taught that the plant resembles an animal, inasmuch as it responds to careful attention.

Position.

The vegetable garden should be in an open position, but sheltered from the hot north winds. If natural shelter is not available then a hedge should be grown just outside the vegetable area. When setting out the area take into account the direction, slope and type of vegetable to be grown. If possible, select an area with a slight slope to the north and north-east, and a soil that is fairly light. The soil for vegetable growing is a very important factor, as the home of a plant must be congenial if it is to grow quickly.

A heavy soil will grow good vegetables in summer, but as it is colder, the seedlings will be more difficult to establish and will be later in maturing. Whenever possible the market gardeners select a light soil even though it needs liberal manuring. They realize that although it may be lacking in much plant food, it is easier to work and warms up more quickly, allowing earlier planting and the production of an earlier crop. A light soil also gives better results than one which is richer in plant food, but which is more difficult to work.

Plan.

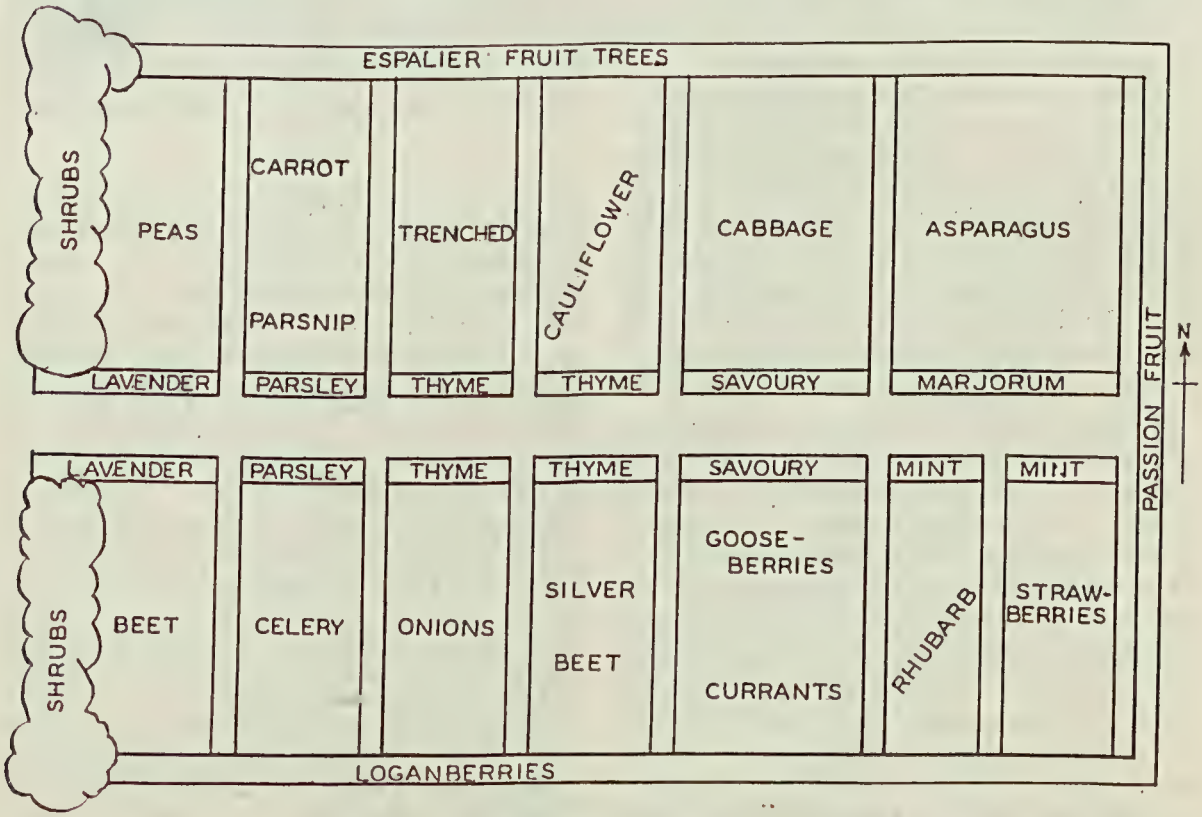
The vegetable crops are annual and perennial, and since the perennials are to be there for years, first consideration should be given to them when selecting positions. The size of the vegetable area is governed mainly by the amount of labour that can be expended upon it. It is better to commence on a small area and gradually increase it as required. A large amount of produce can be obtained from a small area if it is systematically cropped and well cultivated.

Fence the area according to requirements and, if necessary, make it rabbit proof. The fences may be utilized for growing such perennials as loganberries, grape vines, passion fruit, and annual climbing beans. In addition to their food value, these plants give a certain amount of protection to the vegetables.

A general plan for the remainder of the area should be made, taking into account such necessities as water reticulation, &c. The beds should be made rectangular in shape with the long axis running north and south. The length is immaterial, but the width should be governed by the type of soil, the rainfall, and the growing season of the vegetable. With a heavy soil and a winter rainfall, have the beds narrow and raised when growing winter vegetables so that the water can drain away. The beds should be about six yards wide for average soils. For heavy soils narrower beds give better results, but the amount of labour required does not facilitate their use.

After the area has been prepared satisfactorily throw up the beds till they are about six inches above the paths. It is a good idea to grow herbs such as mint, sage, thyme, and lavender around the edging, as they keep the edges tidy, prevent the water running straight off after watering operations, and of course are useful also.

When the soil has been well worked up and a portion trenched ready for planting, the problem of what to plant arises. The beginner should not attempt to grow out-of-season vegetables, or those which are not suited to his particular environment. The selection of good seed is of the utmost importance, and the next step is to sow at the correct time of the year. Out-of-season sowings probably cause the most failures. Important factors are a knowledge of the correct thing to do during the time from when the seeds are sown until the vegetables are ready for picking,



A suggested layout for a vegetable garden.

and the length of time over which the same sowing may be used, e.g., cabbages and cauliflowers take about six months from sowing the seed till ready for cutting, and the same sowing will give cabbages for a period of about one month. Peas take from two to three months to reach the picking stage, and, if well picked, may last for another two months. Therefore a fresh sowing of peas should be made at six-weekly intervals, and cabbages should be transplanted at monthly intervals. This, together with a knowledge of the varieties, is very helpful in obtaining a succession of vegetables throughout the year.

Varieties of vegetables have been selected for earliness and lateness and for summer and winter. It is important to know these varieties and to plant accordingly, e.g., William Hirst peas and English Wonder are early varieties, while Greenfeast is a good medium, and Greenfeast and Yorkshire Hero withstand the warm weather well and are good late varieties.

Manuring.

Vegetables which are grown, to a large extent, on light soils, require a good deal of manuring. It is advisable to use farmyard manure, or, if the soil is very light, cow manure. This organic matter not only adds plant food to the soil but also improves its physical condition.

Generally speaking, there are three types of fertilizers. Nitrogeneous fertilizers, such as nitrate of soda, sulphate of ammonia, and blood, increase leaf growth and are particularly useful where the leafy growth is the portion used as the vegetable. Nitrate of soda has the quickest action, with sulphate of ammonia next, blood being slower, but more lasting. Nitrate of soda would be very useful for lettuces, sulphate of ammonia and blood being useful for slower growers such as cabbages. It is better to add these after the crop has been established.

Phosphates encourage root development and give the advantage of withstanding drier periods. They are very useful for all legumes, and should be added when sowing the crop.

Potash fertilizers tend to improve the health of the plant, and have been found very useful for legumes if added when sowing the crop. In the majority of cases it has been found that a mixture of these fertilizers on the light soils gives the most profitable return. The name Market Garden Manure has been registered on account of this, and it is a good general fertilizer. There are several mixed fertilizers available, or the grower can purchase separately and do his own mixing according to his requirements.

Well developed pea pods of the Greenfeast variety.

Rotation.

Rotation consists of growing a number of crop in sequence on the same area. The genera principles in rotation of crops are :—

To grow dissimilar crops following each other, e.g., a root crop such as carrots to be followed by a legume crop such as peas. A legume to be followed by one of leafy growth such as lettuce or cabbages, and then a root crop to follow a crop that has been heavily fertilized. All plants need the same plant food, but use it in different quantities, and from different depths of the soil. A leaf bearing crop should follow a legume. A typical rotation in a vegetable garden then might be :—

1. Peas—legume ; 2. Cabbages, heavily manured ; 3. A root crop such as carrots ; and 4. Beans, another legume.

Several of the annual crops are easily grown if good seed is obtained, and sown at the correct time, and if the general cultural method is followed. A few words on two perennial crops will be of interest.

Asparagus.—The bed should be well prepared by trenching to a depth of about 2 feet below the surface. The lighter the soil, the more well-rotted cow manure should be used. It is most essential to prepare the area thoroughly, as the crop is to last over an indefinite period. Seed may be used and is sown in seed beds. Later, the plants should be transplanted to their permanent positions.

For small areas, it is better to obtain good first year crowns and plant them in July or August in rows 2 feet apart, leaving 15 to 18 inches between the plant. They should be kept clear of weeds, and given a light dressing of sulphate of ammonia in October, but do not pick any shoots, thus allowing them to grow and send up leaves. About April, cut the foliage down almost to surface level and fork over the ground lightly, remove any weeds, and then give a good heavy dressing of farmyard manure. In August add about 2 oz. of sulphate of ammonia per square yard and cut this year's crop lightly. After the second year it may be cut until November each year.

Rhubarb.—Probably this is one of the most popular and easiest plants to grow. It is one of the most useful because there are winter and summer varieties, which make it an all-the-year-round culinary plant. From a health point of view it is said to be excellent, and from a culinary aspect it should be among the fruits as it takes the place of sweets on the dinner table. In the United States of America it is popularly known as pie plant, for its main use in that country is for making rhubarb pies. The same thing applies in this country, although stewed rhubarb and custard, or stewed rhubarb with something else is also a very popular dish. Rhubarb is a perennial plant, and it requires a rich soil and plenty of moisture for its development.

Rhubarb may be grown from seed, but as the usual farm garden requires not more than 30 plants, it is preferable to obtain rooted portions containing a bud or a crown. The winter varieties should be planted out in March or April and the summer ones in August or September. They should be planted in rows 4 feet apart and 3 feet between the plants in the rows. Unless the soil is very fertile the area should be well manured with farmyard manure. About three months before planting trench the rows about 2 feet deep and place about 6 inches of cow manure in the trench and replace the soil. After the plants are established dress the area with farmyard manure and keep it well watered. If the soil is light, cow manure or fowl manure is better.

Although the plants may be tempting during the first growing season it is advisable not to use them; if you must, well, do so sparingly. The first group of leaves are necessary to the plant to give it a good vigorous start in life. After the first year pull the leaves as required, giving them a sharp jerk outwards and upwards. Do not cut the stalks, as that leaves stumps which decay and partly damage the next crop of leaves. Do not completely strip the plant but allow the small leaves to remain. These assist the plant to store its food for future stalk production. If any flower stalks appear remove them, but if the plant continues to send up flower stalks replace it by dividing up the best plants. After removing the stalks heavily topdress with farmyard manure and water liberally.

There are several very good varieties on the market. Topp's Winter, or Sydney Crimson, as it is called in New South Wales, and Keck's Wonderful are both large stalked, prolific varieties with good colour and flavour. Mariner's Crimson and Victoria Giant are two summer varieties which have large stems of good quality and colour, and are high yielders. A good all-the-year-round variety is Wilson's Ruby, and if a few plants only are to be grown this one is recommended for its all-round qualities.

WIRELESS TALKS FOR FARMERS

WITH the co-operation of the Australian Broadcasting Commission, the Victorian Department of Agriculture is conducting a series of wireless talks on subjects of particular interest to the man on the land. These talks are being broadcast from the regional stations, 2CO (Corowa), 3GI (Gippsland), and 3WV (Horsham) on alternate Friday evenings, the 15-minute sessions commencing at 7.45 p.m. The next talks will be on December 1st and 15th.

In order that these talks might be of maximum value to the farming community the Department is anxious to have the co-operation of listeners, who are invited to submit questions they would like answered over the air. If you have any particular problem connected with the management of your farm, your crops, or your live stock, or with the marketing of your produce, send a letter to Mr. J. Keane, B.Agr.Sc., Department of Agriculture, Melbourne. Your problem will then be submitted to expert officers of the Department, whose advice will be given. If you do not desire your name broadcast use initials or a nom-de-plume, but do not omit to mention your district.

Burnley Egg-Laying Competition

Results of Winter Test

By H. F. Clinton, Poultry Expert

THE twenty-ninth Burnley Egg-Laying Competition commenced on the 1st April, 1939, and will continue until 1st March, 1940, a period of 48 weeks. The winter test conducted in connexion with the annual competition covers only the first four months (122 days) and concludes on 31st July. For this test, certificates are awarded for the greatest number of first-grade eggs laid by teams and individual birds in all classes of the competition. During the first two months a first-grade egg must weigh not less than $1\frac{3}{4}$ oz., and thereafter not less than 2 oz.

The object of the winter test is to give prominence to the birds that lay well during this period of the year, when prices for eggs are high. It is considered that egg production on commercial poultry farms could be considerably improved by breeding from birds that have laid a big number of eggs during the autumn and winter months, and those that lay well at that period are almost certain to continue to do so at other times of the year.

It is pleasing to note that the popularity of Rhode Islands is increasing. In all, 96 Rhode Island Reds are competing—the highest number of the breed that has ever competed in a Burnley Competition, or in any Government Competition in Australia.

Teams of Six.

In Section A, Class 1, White Leghorns, Wet Mash, Mr. F. W. Becker, who obtained first prize in the winter test and also in the final results in this Class last year, again secured first prize with a team that laid 520 first-grade eggs—the highest score recorded in the competition for a team of six birds. One bird laid 102 eggs, all first-grade. Second prize was awarded to the Sorrento Farm for a team that laid 409 eggs; Mr. C. Gowers' team followed closely for third place with 407 eggs.

In Class 2, White Leghorns, Dry Mash, Mr. F. W. Becker also won first prize with a team that laid 501 first-grade eggs. One bird in this team laid 102, all first grade. Messrs. C. and D. McLauchlan took second prize with a team that laid 408 eggs, while Messrs. A. and W. Millington secured third prize with 340.

In Class 4, Australorps, Mr. J. Herbert, whose team laid the highest number of eggs in the winter test in this class, and also established a new 12-months Burnley record (1,740 eggs) last year, again won first prize with a team that laid 515 all first grade. Mr. C. H. Harvey was awarded second prize for a team that laid 427 eggs, and Mr. W. A. Shevill's team secured third prize with 417 eggs. A bird in Mr. Shevill's team laid 103 eggs, all first grade, the highest individual score recorded in Section A.

In Class 5, Rhode Island Reds, Messrs. Tedstone and Rankin carried off first prize for a team that laid 351 eggs, all first grade. One of the team laid 87, all first grade. Mr. S. N. Lloyd gained second and third prizes with teams that laid 346 and 306 respectively.

Individual Birds.

In the Class for White Leghorns fed on wet mash, first prize was won by Mr. H. Lyon with a bird that laid 101 eggs, all first grade. Messrs. Trewin and Graham gained second prize with a bird that laid 98, while Mr. T. Birchall, and Mr. T. L. Eastaugh were equal for third; each of their birds laid 93 eggs.

In the White Leghorn Class, fed on dry mash, first prize was won by Mr. D. Granter with a bird that laid 104 eggs, all first grade. Mr. L. F. Werrett secured second prize with a bird that laid 101, and Mr. T. A. Pettigrove was third with 97.

First prize in Class 3, i.e., all Light Breeds other than White Leghorns, was awarded to Mr. Jock Granter, whose Brown Leghorn laid 26 first-grade eggs; second and third prizes were gained by the Oldham Poultry Farm (J. and F. M. Lees), and Mr. Jock Granter with Brown Leghorns that laid 20 and 19 respectively.

In the Class for Australorps, equal first prizes were awarded to Mr. L. J. Mumford and Mr. C. H. Harvey for birds each of which laid 107 first-grade eggs, the highest number laid by any individual bird in the competition. Mr. J. Chatts secured third prize with a bird that laid 103 eggs.

Mr. L. Snibson obtained first and second prizes in the class for Rhode Islands with birds that laid 98 and 96 first-grade eggs respectively. Two birds owned by Mr. H. Chalmers were equal for third place. Each of them laid 88 eggs.

In the Class for all Heavy Breeds other than Australorps and Rhode Islands, Mr. Jock Granter won first prize with a White Wyandotte that laid 98 eggs, all first grade. Mr. D. Granter secured second prize with a White Wyandotte that laid 95, and Mrs. D. Mason was third with a Light Sussex that laid 88.

Young Farmers' Clubs Section.

In the Young Farmers' Clubs Section, Section B, Individual Birds, first prize in the Class for White Leghorns, Wet Mash, was won by Miss Verna Graham with a bird that laid 73 eggs, all first grade. Miss Graham also secured second prize with a bird that laid 46 eggs, while Miss Thelma Rhodes' entry was third with 30 eggs.

In the Class for Australorps, Miss Flora Rhodes won first prize with a bird that laid 85 first-grade eggs, the highest score in the whole of this section. She also secured second prize with a bird that laid 76 eggs, while Miss Marjorie Parker's bird was third with 70 eggs.

A summary of the leading scores is shown in the accompanying table.

SECTION A.—TEAMS OF SIX BIRDS, TRAP-NESTED.

Pen No.	Name and Address.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 1.—White Leghorns—Wet Mash.			
	First Prize—Champion Certificate.			
3	F. W. Becker, Follett-road, Cheltenham, S.22	522	2	520
	Second Prize—Government Certificate.			
23	Sorrento Farm, Campbell-road, Sorrento	415	6	409
	Third Prize—Government Certificate.			
7	C. Gowers, 52 Argyle-avenue, Chelsea	435	28	407
	Class 2.—White Leghorns—Dry Mash.			
	First Prize—Champion Certificate.			
27	F. W. Becker, Cheltenham	505	4	501
	Second Prize—Government Certificate.			
30	C. and D. McLauchlan, 144 Through-road, Burwood, E.13	410	2	408
	Third Prize—Government Certificate.			
31	A. and W. Millington, "Fenton," Murray-street, Fawkner, N. 15	340	..	340
	Class 4.—Australorps—Wet Mash.			
	First Prize—Champion Certificate.			
55	J. Herbert, 13 Dunn-street, Wonthaggi	515	..	515
	Second Prize—Government Certificate.			
54	C. H. Harvey, Pakenham South	439	12	427
	Third Prize—Government Certificate.			
67	W. A. Shevill, 35 Bourke-street, Mentone, S.11	420	3	417
	Class 5.—Rhode Island Reds—Wet Mash.			
	First Prize—Champion Certificate.			
43	Tedstone and Rankin, 243 Whitehorse-road, Balwyn, E.8	351	..	351
	Second Prize—Government Certificate.			
48	S. N. Lloyd, Cranhaven Poultry Farm, Box 21, Frankston	350	4	346
	Third Prize—Government Certificate.			
41	S. N. Lloyd, Frankston	306	..	306

SECTION B.— INDIVIDUAL BIRDS—SINGLE TEST.

Pen No.	Name and Address.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 1.—White Leghorns—Wet Mash.			
	First Prize—Champion Certificate.			
35	H. Lyon, 33 Clara-street, Preston, N.18	101	..	101
	Second Prize—Government Certificate.			
74	Trewin and Graham, Ardmona	98	..	98
	Equal Third Prize—Government Certificate.			
9	T. Birchall, 180 Harold-street, Thornbury, N.17	93	..	93
	Equal Third Prize—Government Certificate.			
22	T. L. Eastaugh, Pt. Nepean-road, Highett, S.21	93	..	93
	Class 2.—White Leghorns—Dry Mash.			
	First Prize—Champion Certificate.			
216	D. Granter, 163 Martin-street, Gardenvale, S.4	104	..	104
	Second Prize—Government Certificate.			
201	L. F. Werrett, 60 Yerrin-street, Balwyn, E.8	101	..	101
	Third Prize—Government Certificate.			
219	T. A. Pettigrove, 159 Hawdon-street, Heidelberg, N.22	97	..	97
	Class 3.—All Light Breeds other than White Leghorns—Wet Mash.			
	First Prize—Champion Certificate.			
197	Jock Granter, 163 Martin-street, Gardenvale, S.4 (Brown Leghorn)	26	..	26
	Second Prize—Government Certificate.			
195	Oldham Poultry Farm (J. and F. M. Lees), 491 Middleborough-road, Box Hill, E.12 (Brown Leghorn)	23	3	20
	Third Prize—Government Certificate.			
198	Jock Granter, Gardenvale, S.4 (Brown Leghorn)	21	2	19
	Class 4.—Australorps—Wet Mash.			
	Equal First Prize—Champion Certificate.			
133	L. J. Mumford, Steeles-street, Healesville	109	2	107
128	C. H. Harvey, Pakenham South	108	1	107
	Third Prize—Government Certificate.			
103	J. Chatts, White-street, Beaumaris, S.10	103	..	103

SECTION B.—INDIVIDUAL BIRDS, SINGLE TEST.
—*continued.*

Pen No.	Name and Address.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 5.—Rhode Islands—Wet Mash.			
	First Prize—Champion Certificate.			
174	L. Snibson, East Boundary-road, Bentleigh, S.E.15 (Rhode Island Red)	99	1	98
	Second Prize—Government Certificate.			
173	L. Snibson, Bentleigh (Rhode Island Red)	96	..	96
	Equal Third Prize, Government Certificate.			
161	H. Chalmers, Lefevre-street, Spotswood, W.14 (Rhode Island Red)	88	..	88
162	H. Chalmers, Spotswood (Rhode Island Red)	88	..	88
	Class 5.—All Heavy Breeds other than Australorps and Rhode Islands—Wet Mash.			
	First Prize—Champion Certificate.			
230	Jock Granter, Gardenvale (White Wyandotte)	98	..	98
	Second Prize—Government Certificate.			
228	D. Granter, Gardenvale (White Wyandotte)	95	..	95
	Third Prize—Government Certificate.			
231	Mrs. D. Mason, Mt. Evelyn-road, Lilydale (Light Sussex)	88	..	88

FOR INDIVIDUAL BIRDS IN EACH CLASS OF SECTION A.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 1.—White Leghorns—Wet Mash.				
	First Prize—Champion Certificate.				
3	F. W. Becker, Cheltenham	13	102	..	102
	Second Prize—Government Certificate.				
3	F. W. Becker, Cheltenham	15	101	..	101
	Third Prize—Government Certificate.				
3	F. W. Becker, Cheltenham	18	99	..	99
	Class 2.—White Leghorns—Dry Mash.				
	First Prize—Champion Certificate.				
27	F. W. Becker, Cheltenham	162	102	..	102
	Second Prize—Government Certificate.				
27	F. W. Becker, Cheltenham	158	94	..	94
	Third Prize—Government Certificate.				
27	F. W. Becker, Cheltenham	161	86	..	86

(*Continued on page 546.*

Potato Manurial Trials

Results for 1938-39

By G. H. Mattingley, Potato Field Officer

The results obtained from potato manurial trials at Coragulac, Illowa and Koroit were published in the August issue of this Journal, while those from Beech Forest, Toombullup and Neerim appeared in the October issue.

ALTHOUGH potato manurial trials have been conducted in the various districts, indicated below, for periods ranging up to twelve years the dressing of 3 cwt. superphosphate + 2 cwt. sulphate of ammonia has been included in the manurial treatments from the season 1932-33 only. It has been thought desirable therefore, in presenting the average results, to use only the figures obtained during the past seven years, and thus place all manurial dressings on a comparable basis from the point of view of time.

A Crop of Snowflakes at Musk.

Musk.

The plots at Musk were sown on the 1st November, 1938, with the Snowflake variety. Five years previously the land had carried potatoes. Since then it had been under red clover, but later was broken up for a crop of oats and again prepared for the present crop of potatoes. At planting time the soil was in excellent order and in a fairly moist condition due, in part, to the thorough cultivations given after the two preparatory ploughings in February and August.

The plot was inspected on 2nd February. Although it had been very dry, the stand was even and healthy, being better than the average for the district. No difference in top growth was discernible between any of the manurial treatments. Messrs. Bull Brothers are to be commended for the well-kept appearance of the plots. Even at harvest time there was a minimum of weed growth, which was hampering harvesting operations considerably in other parts of the district.

TABLE I.—POTATO MANURIAL TRIALS, MUSK, 1938-39.

Manure per Acre.	Weight Marketable Tubers.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 18	40
Super., 3 cwt.	5 0	43
Super., 4 cwt.	4 18	40
No manure	3 10	..
Super., 3 cwt. + amm. sulph., 1 cwt.	5 8	54
Super., 3 cwt. + amm sulph., 2 cwt.	5 15	64

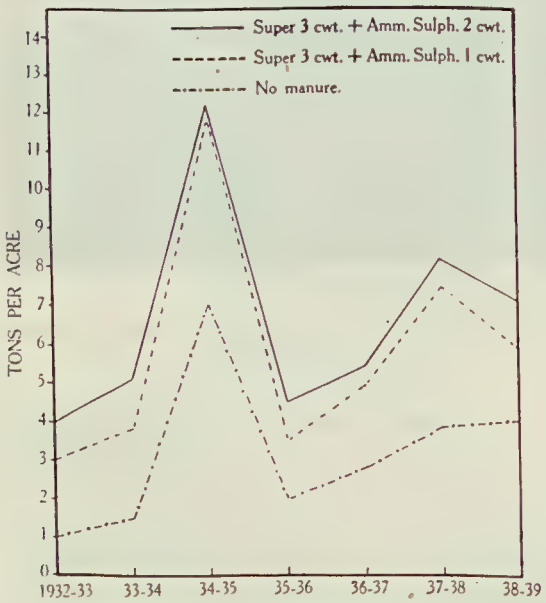
The plot was harvested on 8th June, and the usual increase in favour of the compound superphosphate and ammonia dressings was again apparent, the "3 + 2" mixture being consistent in producing a better yield than the "3 + 1". Over a period of years, the "3 + 2" mixture has produced an average increase in yield of 12 cwt. per acre as compared with "3 + 1", and when it is considered that it

costs slightly less than 1s. per cwt. to produce this increase, the use of the heavier dressing appears to be justified, particularly in years of good prices.

The yields obtained at Musk during the last season are shown in Table I., while the average for the past seven years is given in Table II.

TABLE II.—AVERAGE RESULTS, MUSK, FOR SEVEN YEARS, 1932-33 TO 1938-39.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 13	31
Super., 3 cwt.	4 19	39
Super., 4 cwt.	5 0	41
No manure	3 11	..
Super., 3 cwt. + amm. sulph., 1 cwt.	5 14	61
Super., 3 cwt. + amm. sulph., 2 cwt.	6 6	77



Graph illustrating variations in yields of potatoes at Trentham.

Trentham.

Yields at Trentham were highly satisfactory considering the nature of the season. Planting was carried out on 3rd November under rather dry and windy conditions, using the Snowflake variety. An inspection was made on 2nd February. Although the season was dry, the stand was healthy and of good colour. At this stage it was noticeable that the nitrogenous dressings were showing to distinct advantage over the "superphosphate only" applications as they had produced a larger, denser, and greener growth of haulm.

When harvested on 7th June, the increased yield obtained from the use of the "3 + 2" compound of superphosphate and ammonia was more than twice that obtained from superphosphate alone, confirming the impression gained during the February inspections. Over many seasons it has been clearly demonstrated that 3 cwt. is the optimum rating of superphosphate for this class of country, and it has now become evident that to produce maximum yields consistent with economy, 2 cwt. of ammonium sulphate should be used in conjunction with it, instead of the 1 cwt. commonly used elsewhere.

A glance at Table IV., in which the average results for seven years are given, will show that the "3 + 2" compound manure has given an increase in yield of 107 per cent., which is more than double the yield obtained with "no manure." This dressing has also been most consistent in producing better tonnages than the "3 + 1" mixture, for, on the average, an increase of .16 cwt. has been obtained by the application of the extra 1 cwt. of ammonium sulphate.

The results for the past season are given in Table III.

TABLE III.—POTATO MANURIAL TRIALS, TRENTHAM, 1938-39.

Manure per Acre.	Weight Marketable Tubers.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 3	4
Super., 3 cwt.	4 16	20
Super., 4 cwt.	5 9	36
No manure	4 0	..
Super., 3 cwt. + amm. sulph., 1 cwt.	5 19	49
Super., 3 cwt. + amm. sulph., 2 cwt.	7 2	77

TABLE IV.—AVERAGE RESULTS, TRENTHAM, FOR SEVEN YEARS, 1932-33 TO 1938-39.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 1	29
Super., 3 cwt.	4 16	52
Super., 4 cwt.	4 17	54
No manure	3 3	..
Super., 3 cwt. + amm. sulph., 1 cwt.	5 16	84
Super., 3 cwt. + amm. sulph., 2 cwt.	6 12	109

Wheatsheaf.

Average yields were obtained from the plots at Wheatsheaf which were planted on 2nd November, 1938, with Snowflakes. Normal growth for the season was made, and although an inspection at flowering time did not reveal any differences in growth between the plots, the yields harvested indicated that considerable improvement may be expected from the use of artificial fertilizers.

Superphosphate and ammonia "3 + 1" has been consistent over a period of years in providing the greatest and most profitable increase in yield, costing only approximately 7d. per cwt. to produce. There is no evidence to suggest that the addition of the extra 1 cwt. of ammonium sulphate will be of value in this district, no significant increase in the average yield having been obtained.

The figures for the 1938-39 season appear in Table V., and the average results for seven years are shown in Table VI.

TABLE V.—POTATO MANURIAL TRIALS, WHEATSHEAF, 1938-39.

Manure per Acre.	Weight Marketable Tubers.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	3 0	..
Super., 3 cwt.	3 10	8
Super., 4 cwt.	3 13	12
No manure	3 5	..
Super., 3 cwt. + amm. sulph., 1 cwt.	4 8	35
Super., 3 cwt. + amm. sulph., 2 cwt.	5 3	58

TABLE VI.—AVERAGE RESULTS, WHEATSHEAF, FOR SEVEN YEARS, 1932-33 TO 1938-39.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 9	17
Super., 3 cwt.	4 18	29
Super., 4 cwt.	5 0	32
No manure	3 16	..
Super., 3 cwt. + amm. sulph., 1 cwt.	5 19	56
Super., 3 cwt. + amm. sulph., 2 cwt.	6 0	58

Romsey.

The Romsey trials were planted on 15th November on land that had carried a crop of flax the previous year. The variety Late Carman was used. Dry weather was experienced until the February rains, which were early enough to increase the yield considerably, yet sufficiently late in the season to cause damage through excessive second growth.

Romsey soils are not so responsive to artificial manures as are soils of the same category in other parts of the State. Although the results set out in Table VII. show a significant increase in favour of the "3 + 1" superphosphate and ammonia compound, the average figures, given in Table VIII., show a small response only to manures.

TABLE VII.—POTATO MANURIAL TRIALS, ROMSEY, 1938-39.

Manure per Acre.	Weight Marketable Tubers.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 19	..
Super., 3 cwt.	5 11	12
Super., 4 cwt.	4 19	..
No manure	4 19	..
Super., 3 cwt. + amm. sulph., 1 cwt.	7 2	43
Super., 3 cwt. + amm. sulph., 2 cwt.	6 12	33

TABLE VIII.—AVERAGE RESULTS, ROMSEY, FOR SEVEN YEARS, 1932-33 TO 1938-39.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	5 8	11
Super., 3 cwt.	5 13	16
Super., 4 cwt.	5 9	12
No manure	4 17	..
Super., 3 cwt. + amm. sulph., 1 cwt.	6 3	27
Super., 3 cwt. + amm. sulph., 2 cwt.	6 6	30

Millbrook.

The plots at Millbrook were sown during the last week in November, 1938. The variety President, a comparatively new importation from England was used, as it was desired to produce a quantity of seed of this variety for distribution. However, a below-average yield was harvested, the crop showing great promise in the early part of the season, but failing, because of the lack of rain at the critical time, to grow to full size the large number of tubers produced. This variety is late-tubering, i.e., it does not form the tubers until fairly late in the growing period, and then they develop rapidly if conditions are favourable. This has the effect of minimizing the risk of second growth, in fact, the

sample obtained was singularly free from that trouble.

The yields for the season 1938-39, which are shown in Table IX., are not consistent with those usually obtained from this plot. The average results for six years (the crop failed during the 1937-38 season) are set out in Table X. From this it will be seen that 3 cwt. of superphosphate is the most useful dressing of this fertilizer, but its efficiency is greatly increased by the addition of 1 cwt. of ammonium sulphate per acre. From results obtained so far, the use of the heavier dressing, ammonium sulphate (2 cwt. per acre), cannot be recommended for this class of country.

Seed Storage Shed at Millbrook.

TABLE IX.—POTATO MANURIAL TRIALS. MILLBROOK, 1938-39.

Manure per Acre.	Weight Marketable Tubers.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	2 12	2
Super., 3 cwt.	2 3	..
Super., 4 cwt.	2 9	..
No manure	2 11	..
Super., 3 cwt. + amm. sulph., 1 cwt.	2 16	10
Super., 3 cwt. + amm. sulph., 2 cwt.	3 4	25

TABLE X.—AVERAGE RESULTS, MILLBROOK, FOR SIX YEARS, 1932-33 TO 1938-39.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	5 1	44
Super., 3 cwt.	5 8	54
Super., 4 cwt.	5 4	49
No manure	3 10	..
Super., 3 cwt. + amm. sulph., 1 cwt.	6 12	89
Super., 3 cwt. + amm. sulph., 2 cwt.	6 7	81

NOTE.—This plot was not harvested in the season 1937-38 because of failure of the crop.

SOWS can be real money-makers. Feed them on correctly-balanced Key Meal rations before farrowing and the result will be bigger and stronger litters. Piglets fed on Key Meal rations from the beginning keep healthy and develop quickly to sound well-proportioned porkers or baconers.

Common pig foods, such as swill, grains and tubers are too carbonaceous alone, and tend to make pigs run too much to fat. Key Meal adds the right balance of valuable proteins to form firm, sweet flesh; provides minerals for sound health, bone-formation and quick maturing, and Vitamin B to promote appetite and improve the milk flow in the sow.

Key Meal's sweet, nutty flavour is very appetising too—encourages the pigs to eat heartily, and get full benefit from all they eat. For the greatest live weight gain from every pound of food eaten; for top-grade pigs in the shortest possible time—feed Key Meal.

Send the coupon below for full information on how to balance rations or greater profits.

KEY MEAL FOR COWS, TOO!

Increases milk flow, improves milk quality and keeps the cows in robust health. Finely-ground and free from foreign matter, packed in strong 112 lb. bags — 20 to the ton

LEVER BROTHERS PTY. LIMITED
Dept. 71 V
565-571 Flinders Lane, Melbourne
PLEASE SEND ME FREE COPIES OF:—

(1) "Points about Pig Feeding."
(2) "Feeding Cows for Bigger Profits."

If you need only *one* of these books, cross out the one not required.

Name _____

Address _____

_____

Lever's
Key Meal
—for profitable pig production

OBTAINABLE FROM ALL PRODUCE MERCHANTS

36 71 IV

As Spraying is a Necessity
—then use the World's Best—

NEPTUNE SPRAYS...

The better quality of NEPTUNE Sprays is always obvious by comparison with others. NEPTUNE Sprays conform to the highest standards, and they are consistently uniform in strength and quality. Successful orchardists recommend them. Try them yourself and prove that they're better!

Neptune White Spraying Oil
(SUMMER SPRAY)

NEPTUNE PREPARED RED SPRAYING OIL
("A," "C," Heavy Base)

NEPTUNE PALSOL
(Prepared Pale Oil)

NEPTUNE CLARIFOL
(Winter White Oil)

NEPTUNE LIME SULPHUR SOLUTION
(Clear, amber-coloured, free from sludge)

GENUINE MACCLESFIELD BLUESTONE

CHEMICAL SULPHUR
(23871)

BERGER'S ARSENATE
(Powder or Paste)

COLLOIDAL LEAD ARSENATE

ENGLISH BLUESTONE SNOW

GENUINE BLACK LEAF 40

NEPTUNE LIME

POWDERED SULPHUR

COPPER SPRAY

NEPTUNE SPRAY SPREADER

NEPTUNE OIL CO. PTY. LTD.

(INCORPORATED IN N.S.W.) ALL STATES.

Victorian Seeds Acts

Operations Explained

By F. R. Drake, B.Agr.Sc., Assistant Agrostologist

AN earlier article in this issue (see page 501) has drawn attention to the great variations in quality which occur in agricultural seeds, and has emphasized the importance of purchasing seed on its known performance. Many farmers, however, either do not bother, or do not know how, to obtain the necessary particulars; or again may not have time to wait for the conclusion of tests on samples before sowing the seed. Seed must often be bought quickly; it is frequently ordered without being seen, and must be taken on trust.

In order to protect farmers from exploitation, and to prevent, or at least make illegal, the sale of very inferior seed, legislation has been introduced to control the quality of agricultural seed offered for sale. Apart from the question of protection of the individual purchaser, there is a national aspect to the matter. The use of inferior seed results in loss to the individual, and in turn affects the productivity and economy of the State as a whole. The control of weeds is also a national problem, and the sowing of weed infested seed, by the establishment of new centres for spread by natural means, may affect not only the person making the sowing, but also the rest of the district, and possibly very wide areas. Any legislation to control the sale, either accidentally or deliberately, of seed containing harmful weeds, is therefore fully justified and desirable.

An Act to amend the Seeds Act of 1928 was passed in 1935, and regulations under this Act prescribing standards for agricultural seeds were drafted and gazetted in February, 1936.

Main Provisions of Acts.

The 1928 Act makes it an offence to sell, or expose for sale, any seeds which contain a larger amount or proportion of foreign ingredients than is prescribed. It also requires the vendor to give an invoice with all seeds sold, this invoice to state specifically that such seeds are for planting or sowing, and the kind or kinds of seeds therein referred to. Under this Act, every purchaser of seed is entited to have such seed officially examined, and to receive a certificate of the results of such examination.

Seeds of Cockspur or Malta Thistle (Centaurea melitensis) *found in a sample of Sudan grass.*

It was thus largely left to the initiative of the individual purchaser of seed to have doubtful lots examined, and thus provide the information required to institute prosecutions for contraventions of the Act. This system was found to render adequate policing of the Act difficult, and the Amending Act of 1935 was designed to allow of a more direct procedure. Its most important provision is to empower officers of

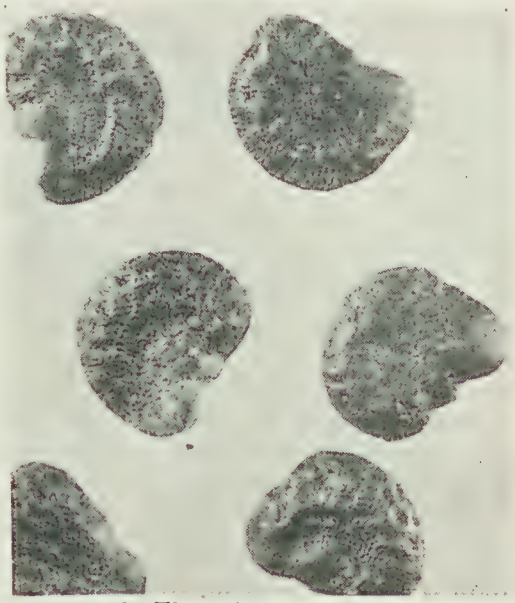
the Department of Agriculture to enter any place believed to be used for the sale or storage of seeds, to inspect such seeds, and to select and purchase samples for examination. This power to inspect premises and purchase samples for the purposes of the Seeds Acts enables information to be easily obtained as to the quality of seeds offered for sale, and the information so obtained may be used to institute prosecutions.

This Amending Act also limits the use of the word "certified" in relation to seeds, to seeds which have been officially certified by a Government Department of Agriculture under a seed certification scheme which is recognized by the Governor in Council as being satisfactory. Authority is given for the making of regulations controlling the carrying out of seed certification schemes in Victoria.

Seed Standards.

The standards to which the various seeds are required to conform are set out in four schedules to the regulations under the Seeds Acts. Schedule 1 lists the "Seeds of Weeds which are Totally Prohibited," while Schedule 2 lists seeds of weeds whose presence is limited to the numbers stated. Schedule 3 prescribes the weights of samples to be submitted for tests. The proportion or amount of "Foreign Ingredients" which may not be exceeded is listed in Schedule 4. The accompanying extracts from this schedule will show what standards are required for some of the more important seeds.

For the purpose of interpreting the results of analyses of samples, the "Foreign Ingredients" are subdivided into "Inert Matter," "Weed Seeds," "Other Crop Seeds," and "Non-germinable Seeds," for each of which the maximum quantity premitted is listed. Inert matter plus weed seeds are shown together



Seeds of the Thorn Apple* (Datura stramonium) *found in a sample of Sudan Grass.

EXTRACTS FROM SCHEDULE 4.

FOREIGN INGREDIENTS.—QUANTITIES WHICH MAY NOT BE EXCEEDED.

Kinds of Seeds.	Percentage Inert Matter Plus Weed Seeds, by Weight.	Percentage Weed Seeds by Weight.	Other Crop Seeds Allowed in Addition to Weed Seeds.	Percentage by Weight of such Seeds Allowed.	Percentage Non-germinable Seeds.
	%	%		%	%
Carrot	3½	½	None	..	50
Lettuce	1½	½	None	..	25
Alsike clover (Trifolium hybridum) ..	2	1	Trifolium repens	5	30
White clover (Trifolium repens) ..	2	1	Trifolium hybridum and/or Trifolium dubium	5	30
Subterranean clover (Trifolium subterraneum)	3	1	None	..	30
Lucerne (Medicago sativa) ..	3	1	None	..	25
Cocksfoot (Dactylis glomerata) ..	21	1	Lolium perenne and/or Lolium Italicum (Italian rye-grass)	6	40
Perennial rye-grass (Lolium perenne)	4	1	Dactylis glomerata ..	3	35
Toowoomba canary grass (Phalaris tuberosa)	3	1	None	..	45

in the second column, and weed seeds separately in the third column. For any particular sample, the inert matter allowance is obtained by subtracting from the figure in the second column the percentage of weed seeds actually present in the sample. For the crop seeds, the presence of 1 per cent. of weed seeds by weight is permitted, while for vegetabes the amount is ½ per cent. For a few kinds, a stated amount of "Other Crop Seeds" is permitted, but for most kinds, any seeds other than those named are regarded as weed seeds for the purposes of the Acts. The wording of the 1928 Act makes it necessary to prescribe the maximum percentage of non-germinable seeds permitted—the minimum germination required is, of course, obtained by subtracting this figure from 100.

Inspections Made.

Following the passing of the Amending Act of 1935, and the gazetting of Regulations, an extensive survey of the retail seed trade throughout Victoria has been made. Many premises and stores devoted to the sale of seeds for sowing have been visited, and samples taken and submitted for examination in all cases where doubt existed as to the quality of the seed.

Since the first inspection on the 2nd May, 1936, 124 visits of inspection have been made, and 370 samples taken and submitted for analysis. Of these, 141 have failed to conform to the required standards. These inspections show that a good deal of inferior seed is being offered for sale, and reveal a widespread lack of appreciation of the real meaning of quality as it relates to seed for sowing.

To date, comparatively few prosecutions have been instituted, and then only in special circumstances. Although deliberate contravention of the provisions of the Seeds Acts has been shown, there exists amongst those engaging in the sale of seeds much ignorance not only of the existence of legal standards to which seeds must conform but also of how seeds are tested, and how the results of such tests are interpreted. The early stage of the administration of the Seeds Acts has therefore been largely educational, and offending vendors have been advised of the requirements, and warned that any further offence will involve the institution of proceedings against them.

Some examples are given below of samples which have been taken by inspectors of seed offered to farmers for sowing. In each case the results of the analysis are shown against the standards required.

1. Subterranean Clover.

Analysis of sample.	%	*Standards required.*	%
Pure seed	27.7	Not below	97.0
Weed seeds (including other crop seeds)	0.4	Not exceeding	1.0
Inert matter	71.9	Not exceeding	3.0
Germination	69.0	(Less weed seeds percentage.)	
Hard seeds	3.0		
Germination plus 1/3 hard seeds	70.0	Not below	70.0

Real value = 19%.

2. Alsike Clover.

Analysis of sample.	%	*Standards required.*	%
Pure seed	99.0	Not below	93.0
Other crop seeds	0.1	Not exceeding	5.0
Weed seeds	0.5	Not exceeding	1.0
Inert matter	0.4	Not exceeding	2.0
Germination	35.0	(Less weed seeds percentage.)	
Hard seeds	16.0		
Germination plus 1/3 hard seeds	40.0	Not below	70.0

Real value = 40%.

In addition to having the low real value of 40%, this sample contained seeds of Cirsium arvense, the perennial thistle, which is a proclaimed noxious weed and listed in Schedule I as totally prohibited.

3. White Clover.

Analysis of sample.	%	*Standards required.*	%
Pure seed	82.0	Not below	93.0
Other crop seeds	6.3	Not exceeding	5.0
Weed seeds	11.2	Not exceeding	1.0
Inert matter	0.5	Not exceeding	2.0
Germination	40.0	(Less weed seeds percentage.)	
Hard seeds	6.0		
Germination plus 1/3 hard seeds	42.0	Not below	70.0

Real value = 34%.

This is an example of a very low quality sample, consisting of only one third pure germinating seed and containing seeds of fourteen different species of weeds.

4. Perennial Rye-grass.

Analysis of sample.	%	*Standards required.*	%
Pure seed	98.4	Not below	96.0
Other crop seeds	Nil.	Not exceeding	3.0
		(of *Dactylis glomerata*)	
Weeds seeds	1.3	Not exceeding	1.0
Inert matter	0.3	Not exceeding	3.0
		(Less weed seeds percentage.)	
Germination	45.0	Not below	65.0

Real value = 44%.

On several occasions examination of seed offered as perennial ryegrass has shown it to consist largely of annual and biennial types. The description, advertising, or invoicing of such seed as "perennial" is a contravention of the Seeds Acts. This type of deception, usually deliberate, has been one of the worst features of the Victorian seed trade for many years, and was especially evident last season, when seed of true perennial rye-grass was very scarce and expensive.

The legislation described above is intended to improve the general quality of seeds offered for sale, and has already brought about a changed outlook on their business by many seedsmen. Apart from any ethical considerations the sale of low quality goods is rarely good business, and persons dealing in seeds are realizing that it is worth while, as well as compulsory, for them to know that their seed conforms to certain minimum standards of purity and germination.

The legal standards prescribed, however, particularly in regard to germination capacity, are necessarily fairly lenient, in order to avoid the condemnation of seed which, though not really first class, is still of definite value. For instance, the germination standard for perennial rye-grass seed is 65 per cent., while really good rye-grass seed should germinate over 90 per cent. Thus there remains ample scope for selection of the best between lots of seed which conform with the prescribed standards.

Seeds of Pennycress (Thlaspi arvense) *found in a sample of White Clover.*

Mallee Research Station—*continued from page 519.*

Stud Plots.

Each year a number of plants considered to be desirable parents are mated at the State Research Farm, Werribee, the progeny being grown and studied in the nursery rows of the stud cereal section at Walpeup. An opportunity is thus being given the plant breeder to examine the new varieties growing under Mallee conditions. In this way, the various factors which go to make up a prolific variety are studied at an early stage in the life of the new crossbred or selection, and those showing weakness of any description are discarded.

The rows have been subject to drastic culling and selection each year, and some 40 wheat and 10 oat selections have now reached the stage when it is considered desirable to multiply the seed and test the selections in small replicated plots.

In addition to the above several varieties are sown for observation purposes, those including Noongar, Pusa, Geeralying, Aussie, Sultan, Duri, Sutton, Felix, Cadia, and Warden.

A museum section has also been introduced. This includes wheats which have been discarded from replicated trials and wheats from other countries, viz., Argentine, South Africa, New Zealand, U.S.A., Canada, England, Spain, Italy, China, Japan, and Iraq.

Rate of Seeding Trial.

During the period 1933–37 a rate of seeding trial, designed to test four rates of seeding, namely, 30 lb., 45 lb., 60 lb., and 75 lb. per acre has been conducted, and, as in the other major trials, the plots were sown at the three periods—early, mid-season, and late. The average results of the trial for the years 1933 to 1937, shown in Table X., indicate that during those years variations in the rates of seeding did not have any marked effects on the yields obtained. These tests, however, were conducted on land comparatively free from weed growth.

TABLE X.—RATE OF SEEDING TRIALS, AVERAGE FIVE YEARS, 1933–37—REPLICATED.

Rate of Seeding.	Early.	Mid-season.	Late.
	bus./ac.	bus./ac.	bus./ac.
30 lb. per acre ..	30·6	26·0	26·0
45 ,, ,, ..	31·7	25·8	26·2
60 ,, ,, ..	31·4	25·8	25 6
75 ,, ,, ..	31·3	25·1	25·6

During the first four years of this test the variety sown was Ranee 4H, and in 1937 Ghurka was used. It is generally accepted that as seeding progresses the rate of seeding of the wheat crop should be increased, but the above results indicate that there is little to be gained by sowing more than 45 lb. per acre on relatively clean land. Seeding rates are governed, to some extent, by the variety of wheat being sown, and the trial has been extended to embrace seeding rates of 20 lb., 40 lb., and 60 lb. of seed per acre with each of the three varieties, Ranee 4H, Ghurka, and Regalia.

Last year's results with these varieties showed little differences in yield due to the various rates of seeding.

TABLE XI.—RATE OF SEEDING TRIAL (SOWN MIDSEASON), 1938.

Rate of seeding.	Regalia.	Ranee 4H.	Ghurka.
	bus./ac.	bus./ac.	bus./ac.
20 lb. per acre ..	24·0	24·5	21·5
40 ,, ,, ..	24·4	24·1	22·3
60 ,, ,, ..	24·7	23·6	20·3

This year, in addition to a continuation of the above experiment which now is sown with three varieties and at three times of seeding, a trial has been included to test these rates of seeding on land where competition from weeds will be obtained.

Time of Sowing Trials.

In the Mallee, highest yields are usually obtained by sowing early, provided that the land is reasonably free from weeds. In seasons with a dry spring, late sown crops seldom yield equal to those sown early, but, as in recent years, late spring rains sometimes benefit late sown crops to a greater degree.

TABLE XII.—TIME OF SEEDING TRIALS, AVERAGE RESULTS, FIVE YEARS, 1932–36.

Variety, Ranee 4H.

	Average Yield Sown Early.	Average Yield Sown Mid-season.	Average Yield Sown Late.
	bus./ac.	bus./ac.	bus./ac.
Time of sowing trial ..	30·2	27·2	24·3

In order to gain further information regarding the effect of time of sowing on the yield of wheat

varieties, this trial has been enlarged to include an early, a mid-season, and a late variety, namely Ranee 4H, Ghurka, and Sepoy, sown at ten-day intervals throughout the seeding period.

Results from this trial also confirm the superiority of early sowing and show the importance of the incidence of the spring rainfall in relation to the time of heading and flowering of wheat in determining the yield of the crop.

Permanent Rotation Trials.

To obtain more definite information as to the effect of crop rotation on the yield of cereals and soil fertility, a permanent rotation trial has been commenced in Field No. 1. This trial consists of twelve rotations, two, three and four course, replicated four times. The rotations are as follow :—

1. Wheat, oats grazed, fallow.
2. Wheat, barley, fallow.
3. Wheat, wheat, fallow.
4. Wheat, oats for hay, fallow.
5. Wheat, pasture, fallow.
6. Wheat, oats for grain, fallow.
7. Wheat, oats grazed scarified in October.
8. Wheat, fallow.
9. Barley, fallow, oats for hay, fallow.
10. Wheat, oats for hay, oats fed off, fallow.
11. Wheat, pasture, pasture, fallow.
12. Wheat, oats for hay, pasture, fallow.

An early crop of Mulga oats at the Mallee Research Station.

In addition to the comparative financial returns obtained from the various rotations, a comprehensive survey will be made each year to determine the incidence of foot-rots, take-all, flag smut, sand drift, or any other factors which may be influenced by any particular rotation.

The paddock was cleared in 1932, sown to Ranee 4H wheat in 1933, oats 1934, and fallowed in 1935. Prior to clearing, opportunity was taken to carry out an exact survey of the timber and vegetation. A chemical soil survey of the area has also been made. In order to test the uniformity of the soil the bulk wheat crop, in 1933, was cut into numerous blocks and harvested as a uniformity trial. In 1936 opportunity was again taken to test the natural variation of the soil, the sites of the permanent experiments being laid out in plots of similar size, and all being sown to wheat under the same conditions. This work involved the sowing and harvesting of some 234 plots.

The crop rotations were commenced in 1937, and it is expected that some years will elapse before the effects of the different rotations on soil fertility become apparent.

OATS.

Although wheat is the principal crop, very large areas in the Mallee are sown each year to oats, principally on stubble land following wheat, and being used either for hay, grain, or feeding off by sheep, horses, and occasionally cattle.

Oats occupy a larger area than is generally recognized, the average area sown in the Mallee over the last ten years being more than 400,000 acres compared with approximately 1,600,000 acres of wheat.

The proportions of the oat crop which are cut for hay, stripped for grain, or fed off by stock, vary greatly from year to year according to seasonal conditions, but it is known that increasing areas have been sown during the past eight years, with the object of providing feed for sheep during the winter and early spring.

Country Householders..

HERE'S THE FINEST INVESTMENT OBTAINABLE

The ELECTROLUX Continuously Operating.. Kerosene Burning REFRIGERATOR

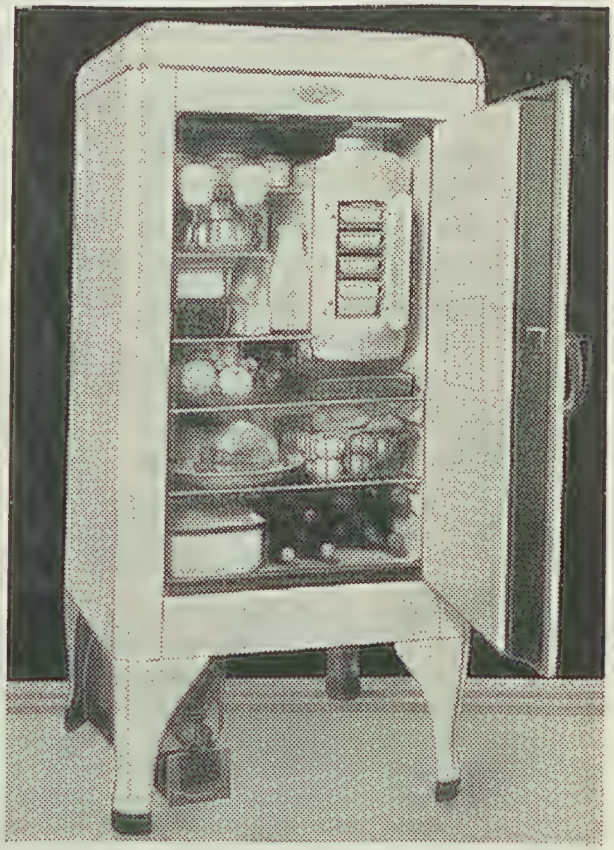
Saves Money – Saves Food – Saves Health

The "Electrolux" eliminates food wastage from the moment it is installed and ensures the purity, safety, and wholesomeness of what you eat and drink. Thousands of country users have proved that the consistent savings effected, more than pay interest on capital outlay and cost of running their "Electrolux."

Why not put in yours now and benefit by the investment without delay?

The record heat wave of January, 1939, thoroughly tested all types of refrigerators, and the splendid reputation of the "Electrolux," already well established, was considerably enhanced by its wonderful performance during the extreme heat. Remember the freezing is continuous in the "Electrolux" kerosene refrigerator.

It is amazingly simple and inexpensive to run. Its benefits in the household are incalculable.



No moving parts—nothing to wear.

Freezing unit guaranteed for 5 years.

Cash prices nett f.o.r. Melbourne.

L.380—£57/10/- LK.550—£69/10/-

Also available on easy terms.

Write for Illustrated Booklet, Testimonials, and full particulars to—

DALGETY AND COMPANY LIMITED—MELBOURNE

(INCORPORATED IN ENGLAND)

SOLE AGENTS for VICTORIA and SOUTHERN RIVERINA.

COMMONWEALTH OF AUSTRALIA
CENTRAL WOOL COMMITTEE

Under the National Security (Wool) Regulations, Clause 14 provides:

"No person shall sell or buy or contract to sell or buy any wool or wooltops except in accordance with these Regulations."

The Central Wool Committee has borne in mind the desirability of maintaining as far as possible consistent with the Regulations existing practices, and early in its Meetings considered the position of Wool dealing having regard to Clause 14.

The Committee resolved to issue to Wool Dealers a permit to allow them to continue to receive wool from Growers and other Owners on terms and conditions which while consistent with the Regulations will enable dealers who obtain permits to continue the substance of their business. A condition of the permit is that the dealer will give an undertaking in the following terms:—

1. **All wool received will be submitted for appraisement in the store or stores of an approved Wool Selling Broker.**
2. **The dealer will keep true and correct records of all transactions pursuant to which he received wool sufficient to enable a proper distribution amongst the Growers and other Owners of such wool of all payments which may follow the appraised price of such wool.**
3. **The dealer will upon notice in writing from the Central Wool Committee under the hand of the Secretary produce such records to the Central Wool Committee or its Executive Member.**
4. **The dealer will fully and faithfully account in respect of the proceeds of such wool to the Growers or other Owners from whom he receives such wool in accordance with the terms and conditions upon which he shall have obtained and received such wool from them.**

There is no restriction upon dealing in sheepskins.

N. W. YEO, Executive Member.

Melbourne, 17th October, 1939.

BLYTH'S
"BLUE BELL" QUALITY SPRAYS

MADE IN AUSTRALIA

For Over Twenty-Five Years "Blue Bell" Arsenate of Lead has Proved a Faithful Friend to Growers

Scientists have, for the past 30 years, recommended Arsenate of Lead as a Standard of Control for Codlin Moth. Practical Tests by Growers and the Latest Chemical Tests by Government Departments have Proved there is No Superior to "BLUE BELL."

We Remind our Patrons that we carry a Full Range of Spraying Materials, Arsenate of Lead (Paste or Powder), Spray Spreader, Lime Sulphur, White Oil, Nicotine Sulphate, Red Oil, Tar Distillate, &c.

CONSISTENT QUALITY IS BLYTH'S POLICY

Procure Supplies from Local Agent or Direct to—

BLYTH CHEMICALS LTD.

31 QUEEN STREET, MELBOURNE

Factory: Prahran Grove, Elsternwick

'Phone: MU 4756

Oat Variety Trials.

Six named varieties of oats have been tested for seven years, the three types, classified according to the order in which they mature, being :—

Early maturing .. Mulga, Gidgee.
Mid-season .. Guyra, Dawn.
Late .. .. Lachlan, Algerian.

In addition to the above varieties, other varieties have been tested for a shorter period. The varieties now being tested are those named above, together with the following—Early Kherson, Burke, Fulghum, Kareela, Algeribee (formerly Algerian Selection P5), Ideal, and three crossbreds, Palestine x Dawn R4–1–1, Palestine x Dawn R46–2–1, and Mulga x Palestine R6–1–1.

In those years in which late rains are not experienced the early maturing varieties can be expected to give better yields than the latest maturing variety Algerian. Over the last six-year period best results have been obtained from Dawn, Guyra, and Mulga.

There is little doubt that the earlier maturing features of these varieties warrant the adoption of at least one of them on a considerable portion of the area sown to oats in the central and northern Mallee.

The results of the main oat variety trials at the Station during the past seven years are tabulated below. In these experiments, the crops were not grazed by sheep at any stage. In all years these trials have been sown between mid-April and mid-May, regardless of soil conditions.

Unfortunately, the grain tests were ruined by high winds during the 1932 and 1933 seasons, and many of the plots lodged and shed badly, so making the tests unreliable, and the results were discarded.

TABLE XIII.—OAT VARIETY TRIALS, 1932–38.

	Hay Section.		Grain Section.	
	Average, Seven Years, 1932–38.	Average, Three Years, 1936–38.	Average, Five Years, 1934–38.	Average, Three Years, 1936–38.
	cwt./ac.	cwt./ac.	bus./ac.	bus./ac.
Dawn	22·5	11·8	14·6	14·2
Guyra	22·4	12·8	14·9	13·8
Mulga	21·4	12·0	16·1	15·4
Lachlan ..	21·4	9·9	13·2	11·8
Gidgee ..	21·1	12·1	12·9	12·7
Algerian ..	20·5	9·6	14·5	12·3
Algeribee ..	..	11·4	..	13·3
Palestine x Dawn R4–1–1 ..	..	10·7	..	17·2
Early Kherson ..	..	10·4	..	15·7
Palestine x Dawn R46–2–1 ..	..	9·5	..	15·3
Ideal	..	9·3	..	11·5

Oats are notoriously difficult to harvest satisfactorily owing to the difficulties experienced in stripping all varieties under similar conditions. It is evident that the earlier maturing varieties give higher yields of grain unless good rains are received in the late spring. A large number of new crossbreds and selections is now under observation, and efforts are being made to produce varieties which will withstand storms to a greater degree than existing varieties.

In Table XIII. it will be seen that the new variety Algeribee, formerly known as Algerian P5, has given better results in both hay and grain yields than Algerian at the Mallee Research Station. Algeribee was produced at the State Research Farm, Werribee, and appears to be destined to replace the standard Algerian variety as a late maturing type throughout the State.

Hay and grain reserves at the Mallee Research Station in June, 1938.

This year the oat variety trial which was sown late in April, on wheaten stubble land with 40 lb. of superphosphate per acre consists of fifteen varieties. A rate of seeding trial is also combined with the above, each of the varieties being sown at three seeding rates. These provide that each variety is sown with the same number of grains (6, 12, and 18) per foot.

These rates correspond to Mulga sown at 30 lb., 60 lb., and 90 lb. of seed per acre. The experiment is divided into three sections, one for hay, one for grain, and on the third section, grain yields are obtained after one early grazing.

Rate of Seeding Trials with Oats.

This trial has now been incorporated in the variety trial as described above, so that further information may be obtained as to the most desirable seeding rates for the various varieties of oats when sown for hay, grain, or grazing.

In 1938, the yields of these plots were so severely affected by drought that a comparison of the results of different treatments is not justified.

During previous years rate of seeding trials have been sown with Mulga, Algerian, and Dawn varieties.

Prior to 1935 hay yields only were obtained from these tests, but since that year grain yields also were obtained.

TABLE XIV.—RATE OF SEEDING TRIALS—OATS.

Hay Section—Cwt. per Acre.

Rate of Seeding.	Average, Five Years, 1933-37, Algerian.	Average, Four Years, 1933-36, Mulga.	1937, Dawn.
30 lb. per acre ..	21·4	18·3	17·3
50 lb. per acre ..	22·0	19·9	17·7
70 lb. per acre ..	23·3	19·5	18·2

Grain Section—Bus. per Acre.

Rate of Seeding.	Average, Three Years, 1935-37, Algerian.	Average, Two Years, 1935-36, Mulga.	1937, Dawn.
30 lb. per acre ..	14·3	16·4	13·2
50 lb. per acre ..	15·4	15·0	14·4
70 lb. per acre ..	15·8	15·6	14·1

In the past, it has been considered that, under Mallee conditions, oats should not be sown heavier than 50 lb. per acre, but investigations at the Research Station, during the past five seasons, indicate that the heavier sowings, up to 70-lb. per acre, have given slightly greater yields of both hay and grain, and other detailed studies have proved that, as might be expected, much more feed is given by the heavier sowings when it is desired to feed off the crop.

From the above, it is seen that oats grown with the object of feeding-off should be sown thicker than normal, and that, if the season turns out to be so favorable that grazing of the oat crop is unnecessary, no loss, and probably a gain, will result from the heavier seeding. Because of the upright early growth and sparse stooling habits of the early and mid-season varieties, it is natural to consider that they should be sown considerably heavier than Algerian. Tests have not substantiated this belief, as it has been found that Algerian responds to heavier seeding in much the same way as Mulga.

Manurial Trials with Oats.

Tests have been sown to determine the effect of various applications of superphosphate, and super. and ammonia fertilizer mixtures. This experiment, which was sown with Mulga oats on wheaten stubble ground, has shown that small increases of hay can be obtained by the use of super. and ammonia mixtures in this district, but so far the increases have not been sufficiently large to pay for the cost of the fertilizer.

Results obtained so far show that the use of more than 30 to 40 lb. of superphosphate per acre with oats on stubble is not justified.

TABLE XV.—OAT MANURIAL TESTS (ON STUBBLE LAND), AVERAGE FIVE YEARS, 1934–38.

Treatment.	Yield.
	Cwt. Per Acre.
No manure	11·7
Super., 30 lb. per acre	13·0
Super., 60 lb. per acre	13·5
Super., 30 lb., ammonium sulphate, 30 lb. per acre	13·6
Super., 60 lb., ammonium sulphate, 30 lb. per acre	14.5
Super., 60 lb., ammonium sulphate, 60 lb. per acre	14·9

To determine if the superphosphate sown with the preceding wheat crop has any beneficial effect on stubble sown oats, plots have been sown in each of the last two years, without manure on the site of the wheat manurial trial in the preceding year. In this manner the

residual effect on oats from the application of 30, 60, 90, 120, and 150 lb. of superphosphate to the wheat crop should be determined.

The results obtained from this trial are shown in Table XVI.

TABLE XVI.—RESIDUAL MANURIAL TRIAL (OATS ON WHEAT STUBBLE LAND), AVERAGE TWO YEARS, 1937–38.

Treatment, Wheat, in the Previous Year.	Oats, 1937–38.
	Cwt. Per Acre.
No manure	18·2
Super., 30 lb. per acre	19·5
Super., 60 lb. per acre	20·8
Super., 90 lb. per acre	21·5
Super., 120 lb. per acre	21·7
Super., 150 lb. per acre	22·1

In addition to the above tests on stubble ground a series of oat plots for hay has been sown to test the effect of super. on this crop when sown on fallowed land. In 1937, the first year of the test, the response of oats to superphosphate on fallow was very marked.

In the next year a marked response to super. was again obtained but, owing to the dry seasonal conditions, the effects of the heavier dressings were less beneficial than in 1937.

TABLE XVII.—OAT MANURIAL TRIAL ON FALLOW.

Treatment.	1937, Mulga.	1938, Mulga.	1938, Algerian.
	Cwt. Per Acre.	Cwt. Per Acre.	Cwt. Per Acre.
No manure	40·8	15·8	16·1
Super., 30 lb. per acre ..	46·2	22·1	18·9
Super., 60 lb. per acre ..	49·1	22·8	22·2
Super., 90 lb. per acre ..	51·6	21·3	22·4

Oat Grazing Trials.

To compare the amount of grazing provided by the three principal varieties when sown on stubble land, without manure, for grazing throughout the season, a comprehensive test at equivalent thicknesses of seeding, ranging from 50 to 60 lb. per acre, was conducted over a period of three years (1935 to 1937).

Three 1-acre plots of each variety were sown with the combine in April, the feed produced being fed off throughout the growing period by sheep grazing on one plot of each variety simultaneously, and then moving to the second and third series in rotation. The number of sheep used at each grazing was adjusted to the feed available, and a record kept of the number of sheep-days (number of sheep multiplied by days of grazing) for each plot of each variety. The dates and times of grazing vary with the seasonal conditions, but each plot was grazed four times from July to November, in 1935 and 1937, and five times in 1936. Tabulated below are the summarized results for the three years, the figures representing the average number of sheep-days per acre for each year in the period July to November.

The figures demonstrate very clearly that most feed at the first feeding-off in July, was provided by the early maturing type, Mulga, but that Dawn, the mid-season type, was very little behind, and excelled in the August and September grazings. The late maturing type, Algerian, gave the greatest quantities of feed in the late grazings, as it responded most to the late spring rains

Oat variety grazing trials—Left, ungrazed; right, grazed.

In a normal year the value of the feed is greatest in the winter, but green feed in November, after the native grasses have gone to seed, is very useful for late lambs. Considering the feed produced throughout the season, Dawn gave 10 per cent. more, and Mulga 6 per cent. less than Algerian.

SHEEP DAYS OF GRAZING, 1935-36-37.

Variety.	Type.	1st Grazing.	2nd Grazing.	3rd Grazing.	4th Grazing.	5th Grazing.	Total.
Mulga ..	Early ..	101	118	122	56	43	412
Dawn ..	Mid-season	97	142	140	87	55	484
Algerian	Late ..	78	121	133	89	60	440

Experiments have been carried out also to determine how the various types recover from a winter grazing, if then left to produce a crop. It has been found that the early maturing varieties, when grazed out once in the winter, had their grain yield reduced by approximately 30 per cent., and 45 per cent. when grazed twice, as compared with the yields of the same varieties ungrazed. The yields of the later maturing types were not so seriously reduced as the result of feeding off the crop, but this effect depends so much on the incidence of the spring rains that one can say little more than that early maturing types can not be grazed as late as Algerian if equivalent hay or grain crops are desired.

Since 1936, the varieties have been subjected to one grazing only, and the reductions in yield due to this grazing in mid-winter are given in the following table.

TABLE XVIII.—OAT GRAZING AND RECOVERY TRIAL. AVERAGE RESULTS, FOUR YEARS, 1935-38.

Variety.	Ungrazed.	Grazed. Once.	Reduction in Yield.
		bus./ac.	per cent.
Mulga	bus./ac.	9·0	38
Gidgee	14·6	8·4	32
Dawn	12·3	9·3	24
Guyra	12·3	10·3	16
Lachlan	12·2	8·7	19
Algerian	10·7	10·1	9
Ideal	11·1	9·6	..

CEREAL DISEASES.

Flag Smut Investigations.

Wheat varieties differ in the degree of their susceptibility to flag smut, and one of the most promising means of control lies in the direction of breeding varieties which are resistant to the disease.

Portion of the non-infected plot of Free Gallipoli in Yield Trial, Flag Smut Investigations, 1933.

View of the plot of Free Gallipoli infected with Flag Smut—Yield Trial, Flag Smut Investigations, 1933.

Infection in the field generally takes place from the spores or seeds of the disease present in the soil. Experimental tests are made by dusting the grains of the varieties to be compared with spores gathered from diseased plants in the previous season.

The importance of this disease in reducing the possible yield of susceptible varieties is shown in the results of the yield trial which was sown in 1933 with infected and clean seed of four varieties.

TABLE XIX.—RESULTS OF YIELD TRIAL, WALPEUP, 1933.

Variety.	Clean Seed.	Infected Seed.
	bus./ac.	bus./ac.
Nabawa (resistant) ..	14·9	14·7
Ghurka (resistant) ..	20·4	17·7
Free Gallipoli (susceptible)	17·5	5·2
Federation (susceptible) ..	13·9	4·4

Other factors affecting the disease which have been studied, include time and depth of sowing, pickling, cutting back (or feeding off), and the application of various fertilizers.

Results of these trials show that in addition to the standard methods of control such as the burning of infected stubbles, fallowing, and rotation of crops, adequate manuring with superphosphate, and efficient pickling with copper carbonate tend to reduce the losses caused by this disease. Other aspects of the disease are being studied further and chemical analyses of susceptible and resistant varieties are being made.

The most important result obtained from these investigations is the discovery of varietal resistance in Ghurka and a classification of the commoner wheat varieties in accordance with their reactions to the disease, has been made.

Very Susceptible ..	Baldmin Federation Regalia Free Gallipoli Waratah Early Gluyas
Susceptible ..	Mac's White Nizam Ranee 4H Bobin Yandilla King Rajah Gluclub Sepoy
Moderately Resistant	Joffre Ford Currawa Gular
Resistant ..	Totadgin Ghurka Sword Dundee Carrabin Geeralying Nabawa Bencubbin

On badly infected areas it is recommended that a resistant variety, such as Bencubbin or Ghurka, be sown.

Ball Smut Control.

The efficacy of various dry pickling powders for the control of ball smut in wheat and the effect of the more common powders on the germination and yield of wheat when clean seed is pickled, are being tested out. In this latter section, the results obtained last year failed to show any differences in yield due to the pickling treatment.

In the trial to compare the effectiveness of various brands and types of dry pickling compounds in controlling ball smut, three copper carbonate treatments and six mercury compounds are under investigation. The method of testing is to sow small drill plots, the seed of each plot having been artificially infected with spores of the disease and subsequently pickled, usually at the light rate of 1 oz. per bushel. Counts of the infected plants are made before harvest in order to determine the percentage of disease in the crop.

TABLE XX.—WHEAT PICKLING TRIAL, 1938.

—	Yield.	Germination.
	bus./ac.	per cent.
Mercury compound C—1½ oz. per bushel	12·1	87
Mercury compound A—1½ oz. per bushel	12·1	82
Copper carbonate—2 oz. per bushel	12·3	78
Unpickled	11·8	90

This trial indicates that most of the copper compounds now on the market are satisfactory in controlling bunt. There are substantial differences between the new mercury compounds, but the better brands are more effective in controlling ball smut than the dry copper compounds and the fact that reduced quantities per bushel can be used somewhat offsets the higher cost of materials. Seed pickled with mercury powders is cleaner to handle and runs more freely through the drill, but owing to the extremely poisonous nature of the mercury pickles, considerable care should be taken in using them.

Loose Smut Control.

The control of loose smut is much more difficult than that of ball smut as in the former the disease is enclosed within the grain and therefore not killed by pickling powders. The recognized method of control is a hot water treatment, but it is not easily applicable to large quantities of seed.

Recent work in the Punjab, India, indicates that high sun temperatures may be utilized to heat the water in which the grain is immersed, providing it is immersed for a longer period than is necessary when the water is artificially heated. The practicability of control of loose smut by this method is being tested.

Efforts are also being directed, at the State Research Farm, Werribee, to the production of varieties resistant to loose smut, and in this regard the variety Forward, which is resistant to the disease, but which is a poor yielder under Mallee conditions, has been mated with the more prolific but susceptible local varieties.

Other Cereal Diseases.

Various organisms causing root rots in cereals have been recorded at Walpeup. As so many species are present, the control of these diseases—root rots, foot rots, and takeall—is very difficult, and several species may be present in the one diseased plant.

The following are some of the diseases which have been identified at the Station.

Wheat—*Ophiobolus graminis* (takeall), *Fusarium culmorum*, *Helminthosporium* spp., *Curvularia ramosa*.

Oats.—*Curvularia ramosa*, *Rhizoctonia solani* (purple patch).

Barley.—*Helminthosporium* spp., *Fusarium* spp., *Curvularia* spp.

Pastures and Forages.

A feature introduced in 1934 was the establishment of a small pasture plant nursery. In this, seeds of drought-resistant species obtained from various parts of the world were tested. Observations were made on their growth, persistence, and suitability for Mallee conditions and, this year, the more promising were promoted into a Pasture Species Trial in which the various species are tested under field conditions.

The excellent season to date has enabled most species to make good establishment and growth. In addition to Wimmera rye-grass and lucerne,

An early maturing strain of Wimmera rye-grass in the pasture plant nursery.

Perennial veldt grass which is being tested for its suitability under Mallee conditions.

perennial veldt grass (*Ehrharta calycina*), crested wheat grass (*Agropyron cristatum*), subterranean clover (Mulwala and Dwalganup strains) and barrel medick, are amongst the most promising of the species under test, but the best methods of establishment, rate of seeding, manuring, and management of these species has yet to be determined. A mixture of barrel medick and Wimmera rye-grass is showing good promise this season and, if it survives tests under more trying conditions, should form an excellent pasture mixture for the Mallee.

Lucerne, owing to its deep rooted habit when established, has ability to withstand dry conditions. A small area sown on fallow in 1935 germinated well, persisted through several summers but was thinned out considerably by the 1938 drought. It has been sown on larger areas this year to determine the most suitable variety and the best methods of establishment, rate of seeding, and spacing between rows. Two methods of sowing have been tried, namely (1) sowing through a grass-seeding attachment, and (2) mixing with super. before sowing in the normal manner with a drill. The former method (grass seeder) gave a much better establishment. It is hoped to test the response to manuring and the effect of different grazing methods on the lucerne sown this year.

Make Electric Light Your Family Xmas Present . . .

GIVE your womenfolk and yourself the great benefits of Electricity. Have clean, bright, healthy electric light at instant command. A Cooper Electric Lighting Plant will supply 8 freely burning lamps for an average cost of 32 pence weekly. This is cheaper than other far less satisfactory forms of lighting, but the comfort and convenience cannot be measured in money.

You owe it to yourself and your family to at least investigate the possibilities of an electric lighting plant. An enquiry *re* sizes, prices, &c., places you under no obligation. WRITE TO-DAY FOR DETAILS.

Cooper Electric Lighting Plants

"Perfect light for a few pence per day"

MADE AND GUARANTEED BY

Cooper Engineering Company Pty. Limited.

542-546 Little Bourke Street, Melbourne, C.1.

IF YOU MUST BE A DAIRY FARMER—FARM CORRECTLY

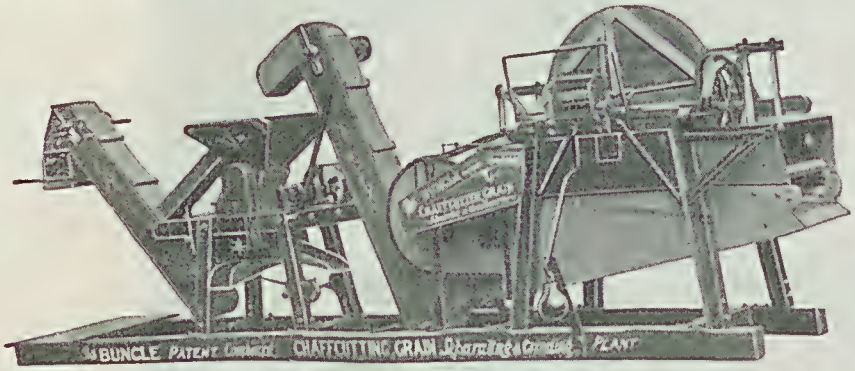
Save cash by making use of ALL the feed you grow

INCREASE YOUR PROFITS

as thousands are already doing by possessing a

BUNCLE Combined Chaffcutting, Grain Separating and Grinding Plant

This patented machine will Chaff, Separate Grain, and Bag from Oaten Hay, Wheaten Hay, Peas, Barley, Millet. Linseed as combined process or individually.



NOTHING WASTED

Size No. 3
15-20 cwt. per hour, 5 H.P

Size No. 2
25-30 cwt. per hour, 8 H.P.

WE ALSO MANUFACTURE

Chaffcutters, Sawbenches. Grinders, Poultry Food Mixers, Root Pulpers, Green Feed and Ensilage Cutters.

HAVE YOU SEEN THE McLEOD PATENT BINDER AND MOWER FINGER?

—Enquire Today—

JOHN BUNCLE & SON PTY. LTD. 17-21 WRECKYN STREET, NORTH MELBOURNE

MODERN DAIRYMEN *use* "STERELIN"

The Modern Treatment for

VAGINITIS, CERVICITIS, and UTERITIS

"STERELIN" is the strongest, non-poisonous, non-irritating, non-corrosive, germicidal known to science. It replaces poisonous irritants previously used for these purposes.

"STERELIN" may be used in the above diseases of the genital tract with the utmost confidence and safety. It is a simple, economical irrigation douche in conjunction with "Pronto" Tonic Physic.

"STERELIN" is a super liquid concentrate used in a 1 in 240 dilution, thus on the gallon price of 60/-, each douche costs 3d. "Pronto" Tonic Physic costs 42/6 for 43 doses and correct equipment 15/-. Smaller quantities if required.

Supplies may be obtained from Butter Factories or Direct from

STERELIN-PRONTO SUPPLIES

59 Whiteman St., South Melbourne, S.C. 5 Phone MX 1407

A general view of the pasture plant nursery at the Mallee Research Station.

Special attention is being paid to species which have become established naturally in the district and attempts are being made to select strains which will provide more feed than the natural ones do at present. Small burr medick is one of the species receiving attention in this regard. A small trial area has been sown to test some new introduced varieties of peas as a possible forage crop in the Mallee.

The search for an efficient, aggressive sand-binder continues, and marram, kikuyu and pyp grass have been tried with inconclusive results.

It has been difficult to obtain seed of some of the more promising plants, in sufficient quantities so sow anything but small trials. In order to overcome this, seed supplies are being built up at the Station.

SAND DRIFT CONTROL.

Cultivation Trials.

Cultivation trials were commenced at Walpeup in 1933, the following cultivation systems being tested in duplicate plots:—

(*a*) Deep fallow, ploughed 5 inches, mid-July, cultivated and sheeped in standard manner.

(*b*) Normal fallow, ploughed 2½ inches, mid-July, cultivated and sheeped in standard manner.

(*c*) Late fallow, ploughed 2½ inches, late September, cultivated and sheeped in standard manner.

(*d*) Sheeped fallow, ploughed 2½ inches, mid-July, not cultivated till autumn.

(*e*) Neglected fallow, ploughed 2½ inches, mid-July, neither cultivated nor sheeped.

(*f*) Non-fallow, ploughed just before seeding.

The results of the trials for five years are given in Table XXI.

TABLE XXI.—WHEAT CULTIVATION TRIALS. AVERAGE RESULTS, FIVE YEARS, 1934–38.

Treatment.	Yield.
	bus./ac.
Deep fallow	22·5
Normal fallow	21·6
Late fallow	21·4
Sheeped fallow	18·9
Non-fallow	15·5

These plots are sown at the normal seeding time with Ranee 4H seed at the rate of 60 lb. per acre and superphosphate at 90 lb. per acre.

In each year a certain amount of soil drifting, due to high winds, took place. In 1934 and 1936 they were sown on old ground typically dirty with weeds, while in 1935 and 1937 they were on newly cleared land comparatively free from weeds. Although present in 1938, weeds were not troublesome. In 1937 the neglected fallow (neither cultivated nor sheeped) treatment was abandoned, but the comparative results between this and normal fallow, over the three-year period, 1934–36, show the average reduction in yield, due to complete neglect of the fallow, to be 10·8 bushels per acre. During the same period, the average yield from the sheeped, but not fallowed, plots was 7·1 bushels below that from the normal fallow, so demonstrating that, if a fallow becomes overgrown with weeds, the usual benefits of fallowing are lost. That sheep cannot wholly replace the cultivator on the fallow is shown by the average yield of the sheeped-fallow plot, which is 2·7 bushels per acre less than that from normal fallow.

It will be seen from a study of Table XXI. that the highest average yields have been obtained from the deep fallow plots. This is attributed partly to the fact that, under some conditions, the immediate effects of drifting were less serious on deep than on normal fallow. The advisability of deep fallowing, however, requires more investigation before conclusions can be reached.

The yield from the late fallow plots is higher than results of similar experiments at other centres would lead one to expect, and should not be taken as a justification of late fallowing. It is pointed out that weed growth on the plots was rigidly suppressed by sheep prior to ploughing, and to an extent which may not be possible or practicable over large areas on the average farm.

It was noticed also that, when even light land was broken up later in the season, it remained rougher and less liable to drift in the summer months than normally cultivated fallow.

In 1936, additional plots were introduced in the above trial, in order to test the practice of sowing a cereal crop in the spring, on land which has been fallowed and treated in the normal manner up to this time. The crop, sown in the spring, is grazed out after the plants have been firmly established, and the roots and remaining stalks are expected to hold the soil till after the summer when the land is again worked and sown in the usual way. The results to date on this portion of the test are given in Table XXII.

Drift control investigations at the Mallee Research Station.—Grazed stubble of cover crop preventing soil from drifting on sandy rise.

TABLE XXII.—EFFECT OF SPRING COVER CROP.

	Wheat yield in bushels per acre.		
	1937.	1938.	Average, Two Years.
Normal fallow	32·8	11·8	22·3
Spring cover crop fallow	31·4	10·7	21·0
Reduction in yield ..	1·4	1·1	1·3

It will be noted that during the two years of test, the spring cover crop caused an average reduction in wheat yield of 1·3 bushels per acre. In comparing these treatments it is necessary to offset the value of the feed obtained from the cover crop against the reduction of the wheat yield.

Additional cultivation trials have been laid down on a permanent site. These trials are replicated and embody eight fallow treatments, viz.: Deep, normal, intensely worked, late, sheeped, scarified, non-fallow (not stubble ploughed), and a treatment in which weeds are controlled till October by means of a scarifier, the area being ploughed as a last cultural operation before the summer.

The 1938 results from these plots confirm those shown in Table XXI. The intensely worked plots did not receive any extra workings before harvest, but were worked after light rain in February and again after the 60 points of rain in April of 1938. All plots in this section made remarkably good and even growth, considering the adverse seasonal conditions experienced.

TABLE XXIII.—PERMANENT CULTIVATION TRIALS, 1938.

Treatment.	Yield.
	bus./ac.
Intensely worked fallow	22·3
Fallow scarified early, ploughed late ..	21·6
Ploughless (scarifier) fallow	21·0
Deep fallow	21·0
Normal fallow	20·7
Late fallow	20·3
Sheeped fallow	18·4
Non-fallow	13·6

Drift Control Demonstrations.

Large scale drift control demonstrations and investigations were commenced in 1937 over an area of approximately 100 acres. It was considered that the following treatments had possibilities in the control of sand drift on fallowed light land:—

(1) Spring cover crop fallow.
(2) Ploughless fallow (scarified).
(3) Fallow scarified early to control weeds, and ploughed as last operation before the summer.
(4) Specially ridged fallow.

Strips of each of the above treatments together with several fallowed normally, and each 35 chains long and 1 chain or more wide, were maintained throughout the spring and summer of 1937–38 and sown to wheat in 1938.

Each strip was harvested separately to determine the effect on the yield of the crop of the fallowing treatments. Owing to the drought conditions low yields were obtained and only small differences were evident. The spring cover strips returned the lowest yield per acre.

During the period when the area was fallowed considerable drift took place, and it was demonstrated that soil drift may be greatly reduced by the adoption of one or more of the following methods:—

(*a*) The sowing on the fallow of a spring crop which, after light grazing, is sufficient to hold the soil from drifting and also to arrest the passage of sand through it.
(*b*) Leaving the fallow as rough as possible through the summer, which may be achieved by mould-board ploughing as the last spring operation, before which the area is either very heavily sheeped or lightly cultivated to prevent the growth, and particularly the seeding, of weeds.
(*c*) Where straw is present to an appreciable extent, the maintenance of it on the surface to hold mechanically the soil from drifting, such to be obtained by the use of the scarifier or disc implement instead of the plough.
(*d*) The ridging (listering) of fallows either shallowly or deeply, which although useful for a short time, offers no real solution to the problem of sand drift.

Of the methods tested, that involving the use of a cover crop was the most effective in preventing the soil from drifting, and the drift on the areas so treated in the demonstration was negligible.

In drought years difficulty may be encountered in establishing a cover crop in the spring. This was the case in 1938 and the cover crop method, together with others tried on the Station, failed to give a satisfactory control in the prevention of sand-drift.

A number of features in connexion with cover crops is now under investigation. These include tests to determine the most suitable plant to sow as a cover, both from the point of view of holding the soil and the effect of different cover crops on the yield of the following wheat crop. The effect of manuring the cover crop and time and severity of the grazing to which it is subjected, are also receiving consideration.

In order to retain the moving soil in the area, listering (special ridging) or furrowing may be carried out on normal fallow land which is showing a tendency to drift. An experiment has been designed to provide information as to the type of ridging and spaces between furrows which will give the best control when such treatment is adopted.

In order to determine the effect of cultivation practices on the nature and erodibility of the soil, the cultivation trials have been enlarged to include fifteen treatments, many of which are conducted both on burnt and unburnt stubble areas. It is proposed to determine the amount of drifting which takes place as a result of each treatment and the influence of the treatment on the yield of the subsequent wheat crop.

The physical condition of the surface soil is of considerable importance in determining the readiness with which a soil will drift and a number of factors, both chemical and mechanical, which affect the soil's physical condition, is being studied.

Other features of the sand drift investigations which will receive attention include experiments and observations on the fundamental causes of wind erosion, studies of the atmospheric and soil conditions concerned, and the effects of erosion on soil fertility.

Egg Laying Competition

(*Continued from page 526*)

FOR INDIVIDUAL BIRDS IN EACH CLASS OF SECTION A—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 4.—Australorps—Wet Mash.				
	First Prize, Champion Certificate.				
67	W. A. Shevill, Mentone	402	103	..	103
	Second Prize—Government Certificate.				
55	J. Herbert, 13 Dunn-street, Wonthaggi	329	102	..	102
	Third Prize—Government Certificate.				
55	J. Herbert, Wonthaggi	326	101	..	101
	Class 5.—Rhode Island Reds—Wet Mash.				
	First Prize—Champion Certificate.				
43	Tedstone and Rankin, 243 Whitehorse-road Balwyn, E.8	256	87	..	87
	Second Prize—Government Certificate.				
43	Tedstone and Rankin, Balwyn	253	86	..	86
	Third Prize—Government Certificate.				
41	S. N. Lloyd, Frankston	245	84	..	84

YOUNG FARMERS' CLUB SECTION. SECTION B.—INDIVIDUAL BIRDS, SINGLE TEST

Pen No.	Name and Address.	Total Eggs.	Under-weight.	First Grade Eggs.
	Class 1.—White Leghorns—Wet Mash.			
	First Prize—Champion Certificate.			
154	Verna Graham, Coimadai Young Farmers' Club, Coimadai	73	..	73
	Second Prize—Government Certificate.			
153	Verna Graham, Coimadai	46	..	46
	Third Prize—Government Certificate.			
156	Thelma Rhodes, Mickleham Young Farmers' Club, Yuroke P.O., via Broadmeadows	41	11	30
	Class 2.—Australorps—Wet Mash.			
	First Prize—Champion Certificate.			
157	Flora Rhodes, Mickleham Young Farmers' Club, Yuroke P.O., via Broadmeadows	87	2	85
	Second Prize—Government Certificate.			
158	Flora Rhodes, Yuroke ..	76	..	76
	Third Prize—Government Certificate.			
159	Marjorie Parker, Mickleham Young Farmers' Club, Mickleham P.O.	72	2	70

Garden Notes

By A. W. Jessep, M.Agr.Sc., B.Sc., Dip. Ed., Principal, School of Horticulture, Burnley.

SINCE the recent heavy rains, the summer annuals are making rapid progress. Lawns are growing very well, and for the next month or so they should be kept well cut, and all weeds must be removed before they become firmly established. The old adage that one year's seeding means seven years' weeding is as true for lawns as it is for other areas. Keep the soil well stirred around the transplanted annuals to prevent excessive loss of moisture during the warmer weather.

Plant out any of the following:—Aster, Bonfire, Salvia, Begonia, Celosia, Coxcomb, Cosmos, Marigold, Pigface, Phlox, Petunia, Sunflower, Tithonia, Zinnia, and Portulacca. Frost-tender climbing plants, including such as Solanum, Mina lobata, Passion vine, Gourds, and the Snail creeper, should also be planted this month.

The area intended for Dahlias should be prepared about the end of this month or early in December. There is no exact time for planting such pants as Dahlias and Gladioli; it depends upon the time for which it is desired to have flowers. As far as Gladioli are concerned, the planting season is a long one, as the leaves are not affected by the frosts.

Planting in July and August would give flowers about 140 days after the date of planting, but the same varieties planted in midsummer, say December or January, would flower in a little more than half that time, i.e., about 70 to 80 days. Thus it will be seen that Gladiolus flowers may be had all the year round, except during mid-winter.

Dahlias should not be planted till all danger of frosts has passed. If desired, flowers can be had from December until the first frost. If flowers are required for Christmas, tubers should be planted in October. Autumn is the popular Dahlia-flowering period, from late February until May. It has been found that early December planting gives better blooms than those obtained from plantings previous to this, for the reason that the plant is rather soft and does not withstand the hot weather.

As the development of a good rooting system is the first essential, it is advisable before planting out to cut back any growth which the tuber may have made during storage. This may appear to some as a waste of good growth, but to leave it will mean only a drain on the resources of the plant, as the roots do not develop before the planting period.

There is a very wide range of Dahlias for selection in regard to size, shape, and colour. For a small garden, the charm and medium garden cactus types are very popular, but for the larger areas, and for the purpose of decorating large rooms, the giant decoratives and garden varieties are more often grown.

Dahlias are quite easy to grow if given a good soil with plenty of moisture, and if each plant is tied to a stake to prevent its being damaged by storms.

The Vegetable Garden.

With the approach of warmer weather, provision should be made for a succession of such salad vegetables as radish, lettuce, and silver-skinned onions. The latter may be used when only about the thickness of a pencil. Make sowings of French beans at intervals of six weeks until March, but now is the best month for sowing climbing beans. Such varieties as Epicure, Kentucky Wonder, Giant Delicious, and Scarlet Runner are popular climbing types which do quite well in Victoria.

Make further sowings of cucumber this month, using an apple-shaped variety, such as White Crystal Apple. This is a prolific bearer, and has a mild flavour.

It is not too late—but soon will be—to make further sowings of pumpkin and melon. Plant out seedlings of lettuce each month, and plant the main crop of tomatoes as soon as possible.

The asparagus should be kept well-picked till the end of November, when it should be allowed to grow up to enable it to store food in its roots for next year. The fronds will begin to turn yellow during April, when they should be cut down and removed from the bed.

A vegetable not grown as much as its value merits is celeriac or turnip-rooted celery, the turnip-like root being used as a vegetable. The leaves are bitter, and useless for human consumption. Sow the seed about November, and when large enough, transplant the seedlings into a good rich friable soil. Unlike celery, they are not sown in a trench, nor do they need earthing-up. Plant them out into rows 18 inches apart and 12 inches between the plants, and keep the ground well worked and watered. When cooked, the roots make a very tasty vegetable.

Orchard Notes

By J. L. Provan, B.Agr.Sc., Senior Horticultural Instructor

RECENT analyses of several orchard surface soils in southern Victoria revealed that during the period mid-August to mid-September the nitrate-nitrogen content was very low. The reason for this appears to be that the heavy winter rains caused the nitrate to be leached from the soil, and many of the soils were water-logged for some months. This, coupled with the low temperatures, reduced beneficial bacterial activity, and no new nitrates were formed. With a rise in temperatures, and less rain, nitrates will be manufactured, but whether they will be available in sufficient quantities for the trees' requirements remains to be seen. It was noticeable that on plots which received 4 lb. of sulphate of ammonia per tree, as well as on those which received applications of complete manure (2:2:1) at the rate of 5 lb. per tree, the nitrate-nitrogen content of the soil was considerably higher. Indications are that deciduous trees will carry heavy crops this season, and in order that a good marketable size will be obtained in the fruit, and the tree will be able to make sufficient growth for next year's crop, applications of fertilizers appear to be essential in many orchards. For the majority of our orchards at least 5 lb. per tree of 2:2:1 complete fertilizer is recommended.

Some growers, particularly in the northern parts of the State, have been interested in fenugreek as a substitute for tick beans for a green manure. The high price of tick bean seed, and the difficulty of obtaining supplies, have caused growers to turn their attention to other crops. Although growers will not be ordering seed for a few months, the results of the recent tests with fenugreek will be of interest. Fenugreek (*Trigonella Foenum-Graecum,* literally Greek hay) is an annual legume found growing wild in western Asia. It is widely used as forage in the Mediterranean countries, and has been tried more recently as a green manure crop in California. It is an erect rather slender stemmed plant about 2 feet to 3 feet tall, with few branches. The seed germinates quickly, and the plant appears to prefer the lighter soil types.

Sowing has been at the rate of 32 lb. per acre, but this is too heavy, and it is considered that 8 to 10 lb. per acre would be more satisfactory. Combined with barley it would make a useful addition to the soil nitrogen content, but sown alone it possesses only about half the bulk of a good tick bean green manure crop. It is advisable to sow the seed in early March.

To control brown rot in canning peaches, a dry-mix lime sulphur spray, 25 lb. per 100 gallons, should be applied towards the end of November. For dessert peaches, a wettable sulphur at the rate of 4 lb. per 100 gallons should be used in late November. Apricots should not be sprayed with sulphur-containing materials.

Citrus growers are advised to refrain from spraying with white oil emulsions during November and early December, as there is a tendency for these sprays to increase the "drop" of young citrus fruits.

Orchardists who experienced difficulty in controlling red spider last summer should maintain a careful watch for this pest early in the season, and, if present, add 1 pint of nicotine sulphate to the usual first cover spray of lead arsenate, 5 lb. of paste in 80 gallons. Careful spraying of the underside of the leaves will ensure better results in the control of this pest.

Chemical or hessian bands, as a supplementary, measure in the control of codling moth, should be placed around the trunks of apple, pear, and quince trees before the end of this month. To obtain the maximum effect from these bands, all other forms of cover for the codling moth larvae should be removed. The time spent in a general clean-up of loose bark, broken limbs, debris, props, &c., and filling up of cracks and crevices in the trees will be well repaid. Usually the spring "peak" period of codling moth flight occurs during the first week in November, and growers are advised to keep in touch with the local orchard supervisors, and inspect the lure charts posted up in their district in order to get the latest information concerning the times of application of the arsenate of lead sprays.

HEALTHY PIGS

Disease causes a heavy economic loss to the pig industry, particularly through slow growth in young pigs and lowered production in breeding sows. Where contagious pneumonia is the cause, all apparently healthy pigs should at once be removed from contact with affected ones. Yard styes and feeding troughs must be thoroughly disinfected. For this purpose there is nothing better than JEYES' FLUID, adding 1 tablespoonful of the FLUID to every 3 pints of water. JEYES' FLUID has a Rideal–Walker co-efficient of 18 to 20, and is thus many times stronger germicidally than other disinfectants, such as lysol, formalin, &c., which are often recommended. The intelligent pig raiser will find the regular use of JEYES' FLUID as a disinfectant spray of immense benefit. He should also see that the pig run is well-drained, and adjust styes to secure warm conditions. By thus improving the hygiene of the piggery, not only will the majority of pig diseases be prevented, but the pigs will be healthier, quicker to fatten, and accordingly will show an increase in profits.

Handy Size Bottles, 1/6 Pints, 2/6
Gallon Tins, 11/3 5 Gallon Drums, 10/6 gal.

FROM
STOREKEEPER OR CHEMIST

For DAIRY UTENSILS

Make "JOYCE" YOUR CHOICE

This Brand GUARANTEES Satisfaction

20 qt. 29/9	40 qt. 38/6	3 gal. 25/9	8 gal. 35/9
30 qt. 34/9	50 qt. 43/-	5 gal. 28/6	10 gal. 38/6

10 inch Neck		Inverted Cover	
40 qt. 39/6	50 qt. 44/-	2 gal. 15/6	4 gal. 21/-
		3 gal. 18/9	

Freight paid per Goods Train.
Embossed Name Plates Free.

FROM YOUR STORE, FACTORY, OR
A. JOYCE & CO. PTY. LTD.
595 Elizabeth Street, Melbourne

YOU GET THE BEST BY USING THE BEST

COCKBILL'S

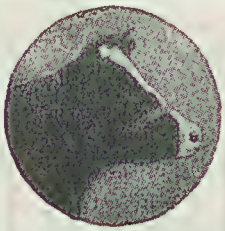
BLOOD & BONE
BLOOD, BONE, & SUPER.
MEAT MEAL
BONE MEAL
BONE GRIT
NEATSFOOT OIL

J. COCKBILL
407 POST OFFICE PLACE, MELBOURNE, C.1
TELEPHONES—CENTRAL 2087, 2096

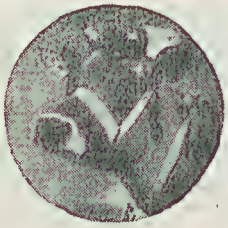
POULTRY
FOR
SETTLERS

WHITE LEGHORNS
and AUSTRALORPS

For prices and particulars apply to
THE MANAGER,
RESEARCH FARM,
WERRIBEE.



Stud Breeders' CARDS



Leading Red Polls

"GIPPS" RED POLLS

The well-established herd of Red Poll Cattle at Warragul High School.

Young Bulls, Heifers, and Tested Females for Sale.

INSPECTION CORDIALLY INVITED.

Inquiries to the Head Master,

WARRAGUL HIGH SCHOOL

Leading Friesians

THE VICTORIA FRIESIANS

The Friesian Herd conducted by the Department of Agriculture at the Werribee Research Farm includes some of the most consistent producers in Victoria.

Males and Females For Sale. *Inspection cordially invited.*

DEPARTMENT OF AGRICULTURE
MELBOURNE

White Leghorns

"Summerford" White Leghorns

for Type and Utility

Successful Exhibitor 1938 Royal Show

Limited Number of Stud Cockerels

Day-old Chicks and Fertile Eggs

For Prices and Particulars—

H. HILL, "Summerford," Tootals Road, Dingley, Victoria

INSPECTION CORDIALLY INVITED.

Advertising Rates

STUD BREEDERS' CARDS

Advertisements for this section accepted at following rates :—

12 months - **15/-** per insertion
6 months - **17/6** per insertion
1 to 3 months - **£1** per insertion

For further particulars write to

Director, Department of Agriculture
MELBOURNE, C.2.

Is a simple arrangement that multiplies the power at the handle 260 times—handy to use, easy to move, quickly rigged, and works in roughest country. Standard equipment pulls trees and stumps from 1½ acres without changing anchor. Many other time and labour-saving features. Catalogue with pleasure.

TREWHELLA BROS. PTY. LTD., TRENTHAM

Now Available

Price 1/9 *(including postage)*

A NEW EDITION of "Beekeeping in Victoria," a comprehensive book in which beekeeping practices are fully described, has been published by the Department of Agriculture.

This publication, which contains 165 pages, is well illustrated, and should be of interest not only to commercial apiarists, but also to those who desire to carry on bee culture as a hobby or side-line to other occupations.

Obtainable from

The Director,
Department of Agriculture,
Melbourne, C.2

LYSAGHT'S

100% Australian Made 100%

Fencing and Other Wires, Wire Netting, Zinc Oxide.

Our Netting and Other Products are known through the Commonwealth as of the highest standard. Obtainable from all leading Merchants and Storekeepers.

LYSAGHT'S AUSTRALIAN MADE WIRE NETTING SYDNEY N.S.W. PROOF

Look for Our Marker in Every Roll of Netting.

Manufactured by

Lysaght Bros. & Co. Pty. Ltd.

Head Office: 17-19 Bridge Street, Sydney
Works: Parramatta River

Agents for Victoria: Gibbs, Bright & Co., 34 Queen Street, Melbourne

MAKING ENDS MEET

There are many ways of meeting the family maintenance problem, but none so satisfactory as having the necessary cash in advance.

To the married man, a State Savings Bank balance of at least a few pounds is essential. He knows then, that he is prepared for the emergencies which so often arise without warning. START SAVING!

THE
STATE
SAVINGS BANK
OF
VICTORIA

Head Office, Elizabeth Street, Melbourne
J. THORNTON JONES, General Manager.

NOTHING TOO SMALL . . .
TOO LARGE OR TOO FRAGILE . . .

That is the fundamental feature of the comprehensive service which the Victorian Railways can guarantee in the transport field . . .

Consider These Few Striking Facts—

6,000,000 tons of goods carried last year . . . claims for loss, damage or delay LESS THAN 4d. PER 1,000 TONS CARRIED ONE MILE.

100,000 bags of wheat can be carried to the seaboard in one day . . . AT AN AVERAGE RATE OF ONLY 4/5ths of a penny per ton mile.

550,000 bales of wool and 12,000,000 head of livestock railed last year.

RAILWAY FREIGHT SERVICE IN ALL SPHERES IS INCOMPARABLY SUPERIOR TO ALL OTHERS . . !

So—Make the rail way your way always . . .

DEPARTMENT OF AGRICULTURE, VICTORIA

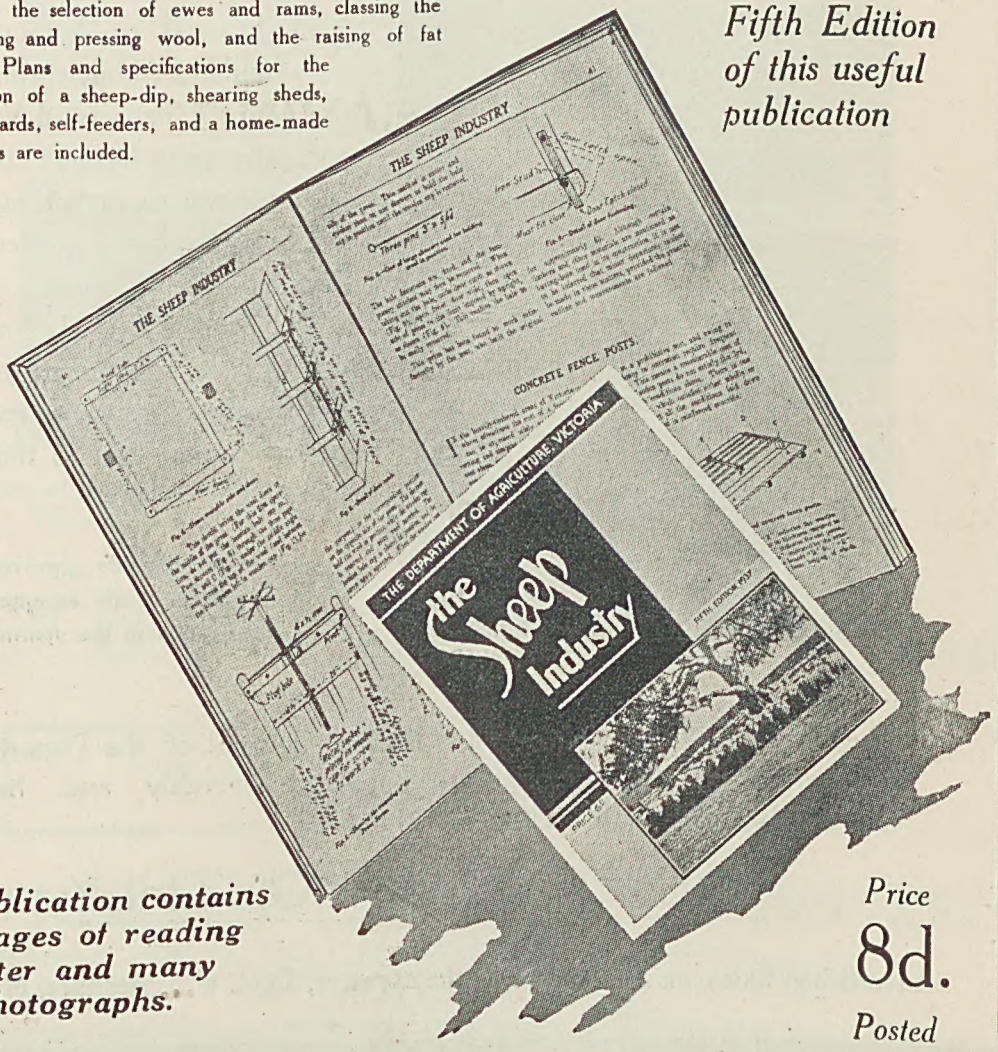
THE SHEEP INDUSTRY

A profusely illustrated publication dealing with Sheep-raising, also Sheep Diseases and their treatment.

NOW AVAILABLE!

A . . . Fifth Edition of this useful publication

METHODS of countering the attack of the sheep blowfly are outlined in detail. Other chapters deal with the selection of ewes and rams, classing the clip, baling and pressing wool, and the raising of fat lambs. Plans and specifications for the construction of a sheep-dip, shearing sheds, drafting yards, self-feeders, and a home-made wool press are included.



The publication contains 108 pages of reading matter and many photographs.

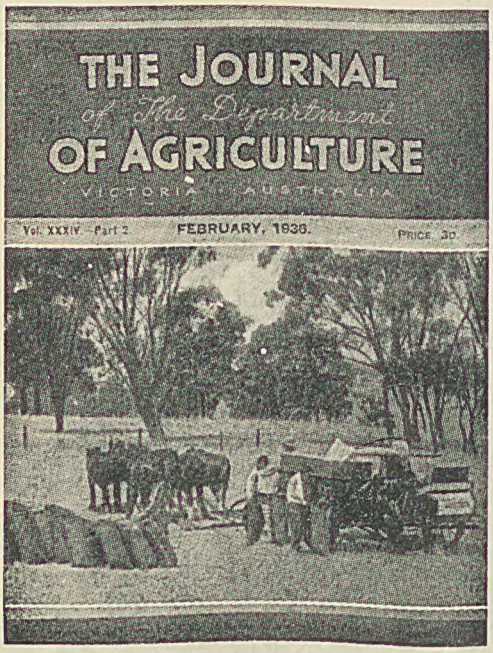
Price 8d. *Posted*

Obtainable from the DIRECTOR, Department of Agriculture, Melbourne, C.2.

The Journal of Agriculture

OFFERS EXCEPTIONAL ADVANTAGES

for ADVERTISING



THE JOURNAL OF AGRICULTURE circulates widely throughout the country districts of Victoria and amongst farmers of the Commonwealth, reaching also country bankers, professional and business men, school teachers, &c. It offers exceptional advantages for the advertising of all goods required by the farmer and in the rural home

Only advertisements approved by the Department are accepted for publication in the *Journal*

The *Journal of Agriculture*—the Official Journal of the Department of Agriculture of Victoria—is published monthly and has a GUARANTEED CIRCULATION of

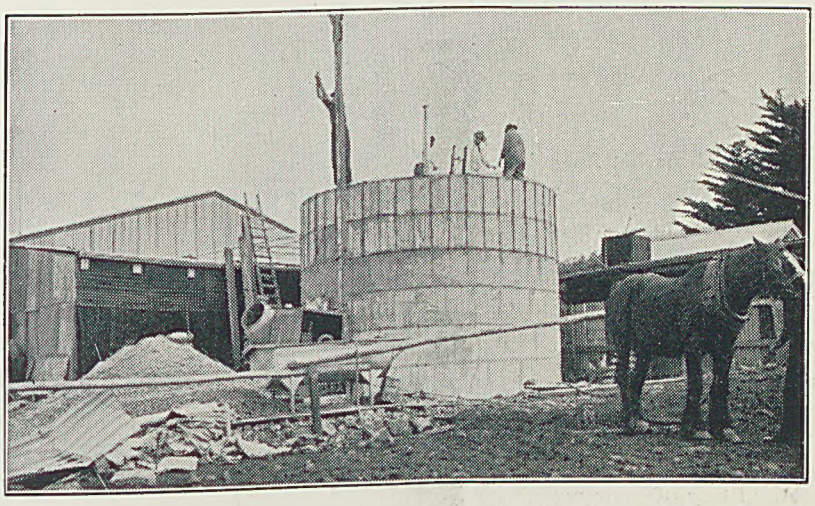
10,000 COPIES MONTHLY

Advertising Rates on Application to the Director, Dept. of Agriculture, Melb., C.2

T. RIDER, Government Printer, Melbourne.

CONCRETE

CONSTRUCT FARM SILOS AND TANKS BY NEW SIMPLIFIED METHOD



Formwork arranged for 6th section and concrete being placed and rammed.
Picture shows roofing timber used as pole for elevating concrete.

"ARC" Brand GEELONG Cement

Write to us for Free Information regarding the Uses of Cement on the Farm

AUSTRALIAN CEMENT LIMITED

TEMPLE COURT, 422 COLLINS ST., MELBOURNE, C.1

Telephone : M 1771 (4 lines)

SPEED UP FARM WORK!

ONE OF THESE TRACTION GIANTS WILL HELP YOU

With an increased market for primary produce, you will undoubtedly welcome any means of speeding up farm work in an endeavour to increase farm output.

One way, already proved by farmers all over Australia, is to fit Dunlop Air Tyres to tractors and farm implements or to specify these tyres on new equipment. Dunlop tyres soon pay for themselves with what they save you! . . . they save up to 33⅓% in fuel — they save up to 50% of your working time and thus enable you to give more attention to other farm duties — they save wear and tear of your machinery — they save you replacement expenditure because they last for years.

Dunlop manufactures a complete range of air tyres for all farm equipment on wheels. Ask your local Dunlop dealer for full details or write to Dept. "S", Dunlop Perdriau Rubber Co. Ltd., 108 Flinders St., Melbourne.

NO NEED TO PAY CASH!

Follow the example of many Australian farmers and use the famous Dunlop Easy Terms Plan. Details on application.

"LUG-BAR"
. . . the only long-lasting tractor tyre that you can successfully use for all farm haulage jobs.

"TRAKGRIP"
. . . specially built for long service and maximum traction under all adverse and wet conditions.

H.F.107.

Fit **DUNLOP TRACTOR TYRES**

THROUGHOUT THE BRITISH EMPIRE MOST PEOPLE RIDE ON DUNLOP TYRES

Dunlop Perdriau Rubber Co. Ltd. (Inc. in Vic.)

SP
630-5
V645